

SMALL STUFF, BIG BUCKS

Don Tapscott: Industries can make big money selling cheap items online through effective micropayment systems. Page 32



LOOK, NO WIRES

Wireless devices and Web appliances make a splash at Comdex/Fall 2000. Page 58

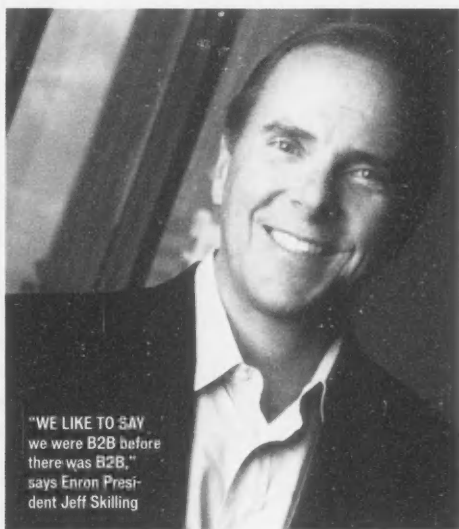
E-GRADS!

Graduate programs in e-commerce are taking off, and most are as fluid as the dot-coms they study. Page 48

COMPUTERWORLD

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NOVEMBER 20, 2000 • VOL. 34 • NO. 47 • \$5 CIRCULAR



"WE LIKE TO SAY we were B2B before there was B2B," says Enron President Jeff Skilling

ENRON HITS THE GAS

AMERICAN AIRLINES, FEDEX, WAL-MART. Now you can add Enron to the pantheon of strategic IT innovators. The once-sleepy pipeline company brought aside skeptics and — in less than a year — built the world's largest e-commerce company, handling transactions worth \$183 billion. With an all-out emphasis on creative thinking and entrepreneurship, Enron has become an unconventional B2B role model, report Julia King and Gary H. Anthes.

Story begins on page 44.

B2BE-COMMERCE

.COM GETS COMPANY; CONTROVERSY FLARES

Naming authority approves seven more domains; some fault selection process

BY PATRICK THIBODEAU
MARINA DEL REY, CALIF.

The organization charged with managing the Web's domain name system last week took the historic step of approving seven new top-level domains, a move intended to challenge the dominance of .com, introduce competition and open the domain naming system to new kinds of uses.

But the process — like the ultimate domain selections themselves — was fraught with controversy. The four-day meeting of the Internet Corporation for Assigned Names and Numbers here was at times the

face-to-face equivalent of a raucous series of exchanges on an Internet mailing list.

ICANN is starting the new domain process slowly, calling it a "proof-of-concept" phase and letting only those companies and organizations with strong technical and business plans offer domains and new competition.

The introduction of the new domains — .biz, .info, .name, .pro, .museum, .aero and .coop — will depend on the success of final negotiations with applicants. The new domains therefore may not be available until next summer.

DOMAIN NAMES

ICANN's long-range plan is to introduce many more domains in the years ahead. Last week's action was "a first giant step for domain-kind," said Esther Dyson, ICANN's outgoing chairwoman.

It's unclear how successful the new domains will be — whether .biz will truly rival .com, or whether industry.

Domain Names, page 81

ASP GROUP LAYS GROUND RULES

Addresses concerns about security, disputes

BY MICHAEL MEEHAN
LAS VEGAS

Hoping to make the application service provider model a better bet for customers, the ASP Industry Consortium last week announced what it said were major breakthroughs on security guidelines and dispute resolution.

Vendors at the Comdex/Fall 2000 show here hailed the news as a needed boost to their efforts to give customers confidence that their agreements are enforceable and that letting an outside company host mission-critical business applications won't expose clients to a pack of cybercriminals.

"Every single sales call I've been on with a customer, I hear those issues," said Denise Grey, president of the ASP group at Verso Technologies Inc. in Atlanta. "I think it's important that ASPs realize we have to come up with some common practices. Don't go

ASP Rules, page 14

PRIVACY COMPLEXITY BOGGLES USERS

Regulations complicate efforts to devise policies

BY JAIKUMAR VIJAYAN

Corporations implementing data-privacy initiatives face complex business and technology issues relating to the access, use, storage and transmission of customer information, according to users.

Not only will such policies have to accommodate emerging domestic and international regulations, but they will also need to be backed by the right technology architecture and processes to ensure compliance, users say.

The biggest challenge is "to develop a clear understanding of the impact of a patchwork of international, federal and state privacy regulations" and to balance that with business and

consumer needs, said Edward G. Schwartz, chief information security officer at Columbus, Ohio-based Nationwide Insurance Cos., during last week's

Privacy, page 16

Chain of Command

To manage privacy initiatives:

■ Companies should appoint a **chief privacy officer** for overarching coordination of all efforts.

■ The **CIO and the chief information security officer** should handle the IT aspects, such as the data architecture.

■ Others are **uniquely accountable** for other aspects of the initiative (e.g., general counsel, government relations and marketing).

SOURCE: EDWARD G. SCHWARTZ, NATIONWIDE INSURANCE COS., COLUMBUS, OHIO

More Comdex News

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U M I
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SO WHAT YOU'RE TELLING ME IS THAT
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THE INTERNET
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WHATEVER



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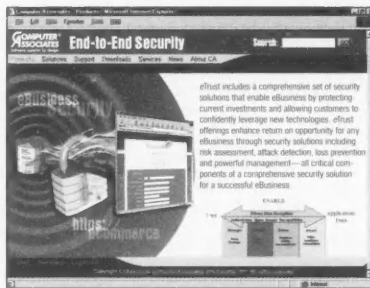
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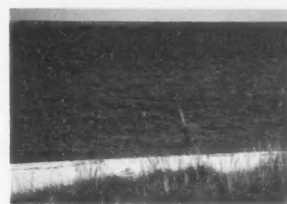
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*According to "Internet Security Software: 1999 Worldwide Markets & Trends," by IDC.



SAVVY SAN DECISIONS

You may not be able to buy a storage-area network on a shoestring, but you can make even an expensive choice cost-effective. Page 62



TIDEWATER TECHIES

The Chesapeake Bay market offers lifestyle options and job opportunities to lure top Internet developers. Page 70

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- 14 EDS LAUNCHES** Blue-sphere, a subsidiary intended to help users with back-end integration.
- 16 CYBERLAWYER SHOCKS** computer security crowd with charges that tough criminal penalties do little to deter hackers.
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- QUICKSTUDY**
- 66 FAULT-TOLERANT** computing means uninterrupted service even when something crashes.
- EMERGING COMPANIES**
- 68 ALACRITECH'S** new network adapter gives servers a network performance boost.

ONLINE

Doing some holiday shopping online? Tell us which sites have been naughty and nice! www.computerworld.com/shoppingsurvey

E-Commerce Community columnist **Jim Sterne** slams the overabundance of advertising that has crept into just about every facet of life and cheers the fact that there's still at least one place on the Web without advertising. www.computerworld.com/ecommerce

This year's **U.S. Bancorp Piper Jaffray Internet conference** was somewhat different than previous years. Reporter's Notebook: After the bubble, at www.computerworld.com/ecommerce

OPINIONS

- 32 MARYFRAN JOHNSON** says the PC crowd is drowning out visionary thinking and possibly your chances of finding a competitive advantage.
- 32 DON TAPSCOTT** thinks industries are squandering Web opportunities by not promoting cheap and effective micropayment systems.
- 33 JOHN MIANO**, chairman of the Programmer's Guild, says coders need to be organized, but chances for unions are bleak.
- 34 JOHN GANTZ** writes that peer-to-peer computing is a beast that IT must master.
- 34 WILLIAM M. ULRICH** argues that e-business integration can't be done without first

integrating the business infrastructures that IT supports.

- 40 ED YOURDON** says bad systems come from bad data from users and suggests a better way.
- 82 FRANK HAYES** warns that Web site "butterflies" could cost you some revenue, the same way those butterfly ballots could cost someone the presidency.

AT DEADLINE

Group to Define XML Security Standard

A group of companies, including VeriSign Inc., Sun Microsystems Inc., Netegrity Inc., Commerce One Inc. and Bowstreet, have announced a partnership to define an XML-based standard for sharing information about security in business-to-business and business-to-company transactions.

Called Security Services Markup Language, the specification will address three main areas of security services: authentication, authorization and privilege. Reviewers of the standard include Oracle Corp. and PricewaterhouseCoopers.

Automakers Agree on Dealer Networks

DaimlerChrysler AG, Ford Motor Co. and General Motors Corp. last week reached an agreement to establish a common networking infrastructure for their dealer networks.

The Big Three automakers said they anticipate that most of their applications, such as those used to track vehicle inventories, will migrate to the Web within the next three years.

Setting a common infrastructure standard will also aid communication for multifranchise dealers, which sell vehicles from several manufacturers, officials said.

Short Takes

A federal judge in New York has halted the state's enactment of a new law that would ban direct cigarette sales over the Internet to prevent minors from obtaining them. . . . Redwood City, Calif.-based MAIL ABUSE PREVENTION SYSTEM LLC has placed EXACTIS.COM, a marketing subsidiary of Denver-based 24/7 MEDIA INC., on its list of spammers for failing to abide by agreed-upon protocols to prevent sending mass, unsolicited commercial e-mail. . . . Announcing a series of cost-cutting measures, THESTREET.COM INC., a New York-based provider of online financial news and commentary, said it will cut 20% of its workforce, shut down its U.K. operation and wind down its joint-venture newsroom with the *THE NEW YORK TIMES* by the end of the month.

Companies Accept, Reject Microsoft's .Net Initiative

Developers say contest waged over objects

BY LEE COPELAND

CITING concerns about retaining talent and demands from upper management to push forward with e-commerce efforts and quickly integrate systems from a \$40 billion acquisition, General Electric Co. last week outlined why it opted out of Microsoft Corp.'s new .Net initiative.

Instead, the massive Fairfield, Conn.-based powerhouse decided to overhaul many of its Web efforts with Java.

"We looked at COM, and really, when we got to the .Net paradigm, it was a fork in the road," said Tim Oliver, a systems analyst at GE. "Being the big company that we are, we thought the better option for us would be to go cross-platform and with the Java technologies." Oliver spoke at an open roundtable sponsored by Kennesaw, Ga.-based ComponentSource at Comdex/Fall 2000 last week.

Less than six months ago, many of GE's development efforts relied heavily on Microsoft's Component Object Model (COM), an object-oriented software architecture. But then GE acquired Honeywell International Inc., and GE management said it wanted to complete the systems-integration work from that merger within a year, Oliver said. That makes waiting for Microsoft's .Net—which is due in pieces during the next year—impossible, he said.

De-Emphasizing COM

Uncertainty about the future of COM and distributed COM (DCOM) within the .Net framework still needs to be addressed, said Dwight Davis, an analyst at Boston-based Summit Strategies Inc.

Microsoft is "not abandoning COM altogether," Davis said. "But as you expand into Web-based computing with a wider

range of computing partners and devices, you cannot be assured of the persistency of a connection, and so they will de-emphasize COM and DCOM and shift to a more loosely coupled [infrastructure] for Web applications."

A Middleware Layer

According to Microsoft officials, .Net will transform applications into services that can be used via computers and devices over the Web. The .Net framework is a middleware layer that allows applications and services written in different development languages

to run on a Common Language Runtime environment.

The time frame for its delivery isn't a factor for all organizations, such as the U.S. Department of the Treasury, which also participated in the roundtable.

"Prior to .Net, Java and [Enterprise JavaBeans] seemed to be the best thing out there," said Buck Buchanan, a senior programmer at the Treasury's Financial Management Service. "But when .Net hit, we thought, 'There's the answer.'"

The Treasury Department is in the midst of converting from a mainframe-based environment to a PC-based one. It's also preparing for an internal mandate that requires it to service its agency, governmental

and civic customers using Web-based services and electronically cut checks by 2005. ▀

.Net Shipping Schedule

The three parts of Microsoft's .Net—the .Net framework, C# development language and Common Language Infrastructure—may ship separately, but within the same time frame.

- First beta available the last week of this year
- Second beta due in first half of next year
- Final version to ship in second half of 2002

Microsoft Official Lays Out BizTalk Server Road Map

BY CAROL SLIWA
LAS VEGAS

Microsoft Corp.'s long-awaited BizTalk Server will feature a heavy-duty enterprise edition and a more economically priced standard version when it ships early next year, a company official disclosed last week at Comdex/Fall 2000.

BizTalk Server is Microsoft's XML-enabled application integration software to help companies do business-to-business transactions. It handles the critical document routing, data

transformation and tracking of messages that companies need to participate in business-to-business marketplaces.

Two Editions

To date, Microsoft has been sparse with pricing details. But Microsoft technology specialist Duane Pressley told a gathering of Comdex attendees that the standard edition, which runs on a single CPU, will sell for roughly \$5,000. The enterprise edition, for up to eight CPUs, will be priced at approximately \$25,000 per CPU, he said.

Pressley said he expects that large hub marketplaces will require the enterprise edition, but most companies starting out will be able to use the standard edition. The beta version of BizTalk Server was the enterprise version, he said.

Microsoft expects to start pressing BizTalk Server CDs later this month, according to Pressley. He said the product will likely be generally available in January or February.

First announced in March 1999, BizTalk Server had been slated to ship by the end of that year, but target dates slipped as Microsoft worked to add workflow capability to the product.

The code generally has been "very stable," said one early adopter, Lisa Miller, director of information technology at Washington Publishing Co. in Rockville, Md. Her company publishes information about how to implement transaction standards for various industries, including health care and petroleum.

Miller said her company encountered a few "glitches" last week with the parsing of electronic data interchange documents but that Microsoft is working to fix the matter.

James Kobielus, an analyst at The Burton Group in Midvale, Utah, said he thinks it more likely that the product will go to manufacturing in the first quarter.

"I think the three-month beta would be a little bit too aggressive, considering the stakes involved and the complexity of the product," Kobielus said. ▀

JUST THE FACTS

Talking B2B

Microsoft's BizTalk Server aims to help companies participate in electronic marketplaces.

Key functions include:

- Secure data transformation and exchange.
- Tracking and analyzing of data and documents.
- Orchestration environment for designing, creating and managing business processes.

MORE THIS ISSUE

For more Comdex/Fall 2000 coverage, see pages 12, 14, 58 and 81.

Integration Key to New-Style Brokerage, Study Finds

Focus for customers shifts away from cost

BY MARIA TROMBLAY

The price wars behind them, leading brokerages are now competing for customers based on service and cross-channel integration — and information technology spending in 2001 will reflect that, according to a study released last week from Needham, Mass.-based TowerGroup.

What's the reason? With some brokers charging \$5 or less per trade, prices can't get much lower. Also, there's a limited number of customers who want no-frills, bare-budget trading.

"The self-directed channel is a very small proportion of the overall market," said study

author Edward Kountz, an analyst at TowerGroup. "Firms are looking for ways to establish themselves in other market segments, and, clearly, the way to do that is through additional service and support."

As a result, he said, TowerGroup expects retail brokerages' IT spending next year to concentrate on front-office applications.

Specifically, brokerages will be investing in portfolio management, relationship management and decision management tools — both for the retail user and the financial professional (see chart).

Part of the reason for this shift, Kountz said, is the influ-

ence of multichannel delivery — investors expect to be able to reach brokers in person, by phone, on the Internet and through their wireless devices.

"The role of the retail broker is evolving into that of a trusted financial consultant," said Kountz.

The best example of this new kind of "optimal" brokerage, Kountz said, is Charles Schwab & Co. in San Francisco.

Schwab offers not only do-it-yourself online trading but also access to advisers, research, planning tools and even bricks-and-mortar branches. The most recent addition to Schwab's line of services was last week's purchase of Chicago Investment Analytics Inc., a private research firm that specializes in quantitative investment research.

"This will help our clients make better decisions," said Schwab spokesman John Sommerfield. "It's not just execution of trades anymore."

The same model — a wide spectrum of services across multiple channels — is being applied at Fidelity Investments in Boston, which has 77 investor centers, more than 3,000 call center representatives, a computerized voice-response system that works via voice recognition, touch-tones and wireless and Internet access.

Another example of this multichannel, multiservice approach is eTrade Group Inc. in Palo Alto, Calif., which is opening an investor center in New York and offering investment advice through a partnership with Ernst & Young International.

Brokerages' IT Spending

Spending will be concentrated on serving customers next year (numbers in billions):

Portfolio management	\$1.59
Relationship management	\$1.43
Decision support	\$1.34
Core processing	\$1.06
Financial planning	\$0.99
Compliance tools	\$0.49

SOURCE: TOWERGROUP, NEEDHAM MASS.

But, "other firms are at a lesser stage of development," Kountz said.

Citigroup Inc., for example, just launched its CitiTrade online brokerage service, which offers a variety of financial planning tools. However, New York-based Citigroup is bucking the integration trend by keeping CitiTrade accounts separate from those in its other brokerage unit, Salomon Smith Barney Holdings Inc. (See related story, page 24.)

That was a mistake, said TowerGroup analyst Larry Tabb. "It's very difficult for that model to be successful," he said. "What you're seeing is that all the large online brokerages are rushing to create a full suite of services — everything from discount trading to private banking." ▀

Hughes Offers Two-Way Satellite Broadband Service

DSL, cable options for remote workers

BY BOB BREWIN

Hughes Networks Systems Inc. plans to offer two-way, broadband satellite services targeted at remote workers and offices and small businesses starting next month. This adds yet another option for companies considering high-speed phone lines, Digital Subscriber Lines (DSL) or cable modems to serve their scattered workforces and offices.

Though Hughes has yet to set pricing for what it calls the Satellite Return service of its DirecPC Broadband Everywhere package, Jan Haugan, chief exploration officer at OptiStreams Inc., a Hughes value-added reseller in Fresno, Calif., said he can undercut phone-company pricing for a T1 line (1.544M bit/sec.) "by up to 35%."

Germantown, Md.-based Hughes offers one-way DirecPC broadband service at speeds ranging from 400K bit/sec. for its consumer package to a 4M bit/sec. service

Pipe in the Sky

Hughes' two-way satellite broadband service highlights:

- **128K bit/sec.** upstream initially, increasing to 500K bit/sec. in two years.
- **400K bit/sec.** to 4M bit/sec. downstream.
- **Service starts in December.** Office Depot will sell kits at stores nationwide.
- **Service targeted at remote offices/workers** and offered as an alternative to DSL and cable modems.

used by Digital Generation Systems Inc. in San Francisco to deliver commercials to more than 800 TV stations nationwide. For the return, or upstream link, customers must use a dial-up modem with a maximum speed of 56K bit/sec.

The new Satellite Return package will boost upstream speeds to 128K bit/sec., according to Steve Salamoff, assistant vice president at Hughes, a subsidiary of Detroit-based

General Motors Corp.

StarBand Communications Inc., a McLean, Va.-based company backed by Microsoft Corp., started offering a similar two-way broadband satellite service earlier this year.

Jeffrey Kagan, an Atlanta-based communications analyst, called the two-way satellite service a "real breakthrough, as good as DSL or cable modems without the wires. . . . But we're going to have to wait until they get a few thousand customers to see if it really works."

Hughes plans a big push to market the two-way broadband service to business users, Salamoff said, with outlets of Delray Beach, Fla.-based Office Depot Inc. around the country slated to start offering the service and a satellite kit "within a week."

Bert Trevail, interim director of technology at the Modoc Joint Unified School District in Alturas, Calif., has been using the Hughes two-way satellite service since September 1999, long before its commercial launch, with 360 computers in six schools hooked up via a LAN to three separate dishes.

Trevail said he explored both phone and cable-modem service connections but decided to go with OptiStreams and the Hughes service based on cost and reliability. A T1 line would have cost Trevail

\$3,000 per month, while he's paying \$1,500 a month for Hughes' service, including his own Internet protocol address. He had previously paid \$1,000 for a virtual private network connection.

Dan Greeley, an automatic data processing co-ordinator at the U.S. Fish and Wildlife Service in Hadley, Mass., said he plans to roll out the Hughes satellite service to 85 fish hatcheries and wildlife refuges he supports in 13 states in the Mid-Atlantic and Northeast, with the satellite dishes feeding LANs that serve from five to 25 users.

These facilities are so remote, he said, "that the only connections they can get is with a dial-up modem, and in some places, the best they can do is 14.4 [K bit/sec.]."

Greeley added that he definitely wants to use the Satellite Return service because it offers higher speeds than dial-up to support the transfer of fat geographic information system files.

Selim Bingol, a spokesman for SBC Communications Inc., said Hughes' entry into the market to provide broadband services to remote workers and offices "shows that this is a very competitive marketplace . . . but we believe DSL is a terrific product, and we're rolling it out as fast as we can." ▀

Corrections

Due to an editing error, the name of the customer relationship management application used by Marriott International Inc. was misspelled in the Workstyles story on page 60 of the Nov. 13 issue. The software is from Siebel Systems Inc.

The name of one of the officers of Datasweep Inc. was spelled incorrectly in a photo caption in the Sept. 25 issue on page 104. The correct spelling is Donald Frederick.

Due to an editing error, the size of TurboLinux Inc.'s workforce was incorrectly stated as 2,000 in a Linux article on page 110 of the Nov. 13 issue. In fact, 2000 was a reference to the year in which the workforce cuts were made.

Application Integration Market Faces Hurdles

Users say EAI can be costly, time-consuming

BY MARC L. SONGINI
ORLANDO

ENTERPRISE application integration (EAI) software offers corporate customers a packaged approach to tying together disparate systems and applications. But the nascent EAI market is beset with challenges, including a dearth of established vendors and the need for users to revamp business processes to make these initiatives work, said attendees at a Gartner Group Inc. conference here last week.

The EAI business continues to be beset by a "lot of turmoil," said Gartner analyst Roy Schulte during a roundtable discussion at the conference. Packaged EAI software was virtually nonexistent just a few years ago. Today, there are roughly 40 vendors

vying for the budgets of users with integration projects in the works, Schulte said.

EAI is growing fast (see story at right) and can allow greater collaboration and data sharing internally and with business partners. Stamford, Conn.-based Gartner predicts that 80% of leading companies will have real-time, centrally located EAI systems in place within a few years.

But there are a number of obstacles. For example, EAI applications aren't as fast or as scalable as users need. EAI also forces change to existing business processes, and there are trust and security issues, said Karen Peterson, another Gartner analyst.

For instance, one company might be hesitant to connect its supply-chain systems with a supplier that might also be a

potential rival or have a different set of buying or selling processes, she said.

"We spend a lot more time connecting with our partners than connecting internally," Robert Carter, CIO at FedEx Corp in Memphis, said in an interview after the show. The key to such implementations is making sure the systems are in sync, he said. This will enable things such as prioritizing key data transfers from one enterprise to the next. "The devil is in the details," he added.

Other executives have been careful about picking the right EAI partner. "I wouldn't hesitate to go with a smaller company that might get bought out," said Scott Rogers, a systems integrator at clothing manufacturer VF Corp. in Greensboro, N.C. But, he added, VF—which makes Lee and Wrangler jeans—chose EAI technology developed by New Era of Networks Inc. in Englewood, Colo., partly because of the vendor's relationship with IBM.

While integrating applications is seen as a valuable step, users said executing an EAI



ROBERT CARTER: "The devil is in the details"

Bracing for the Big Guns

The fast-growing EAI market is highly dynamic and ripe for change as numerous small vendors jockey for position, according to users and analysts.

Research firm Gartner Group predicts that sales of EAI software will total about \$1 billion this year, up from a mere \$240 million in 1998. But Roy Schulte and other Gartner analysts said they expect a lot of changes to occur in the not-too-distant future, including the emergence of IBM and Microsoft Corp. as dominant EAI vendors.

But the products offered by IBM and Microsoft are far from mature, Schulte said. For example, Microsoft has yet to release

its BizTalk Server 2000 system (see story, page 6), and IBM faces a potentially disruptive transformation of its MQSeries Integrator software, which is being updated in a new release.

Microsoft's expected arrival as a major EAI vendor could help legitimize the technology in the eyes of many users, said Randy Reed, an application engineer at The Foxboro Co., a Foxboro, Mass.-based maker of industrial control systems that is considering using BizTalk Server 2000.

"[EAI] is still an immature market," Reed said. "People are waiting for a big player to come in."

—Marc L. Songini

project is usually time-consuming and potentially expensive.

"Our experience is that it does take a lot longer than you expect," said Karl Kvool, an application architect at a large U.S. manufacturer that has been testing EAI software internally. He said he's finding that there are problems with disparate data formatting methods that prevent seamless connections between communication lines.

When relying on EAI to help integrate supply chains, firms should first re-engineer their core business processes and rationalize their trading-part-

ner participation, said Peterson. Otherwise, she said, "they will risk investing in a failed initiative or, worse, risk the health of the entire business."

"It's not a technology challenge," said Carlos Salas, CIO at Grupo Transportacion Ferroviaria Mexicana SA de CV, a Mexico City-based transportation and logistics company. His firm uses applications from Reston, Va.-based Saga Software Inc. to connect disparate railroad scheduling and billing systems and present them to customers through a Web graphical user interface. ■

HMOs Team to Develop Online Transaction System

Goal is to standardize back-office processes

BY LUCAS MEARIAN

In the latest attempt to standardize the way doctors verify the benefits eligibility of patients and submit medical claims, a group of seven large health maintenance organizations (HMO) last week announced the details of a plan to create an online transaction system that will provide direct connections between physicians and insurers.

The system is being developed by MedUnite Inc., a San Diego-based start-up that was funded by the HMOs. The an-

nouncement came four months after the insurers said they were working jointly to develop common methods of electronically processing medical-related transactions.

MedUnite's system will be similar to one already operated by WebMD Corp., an Atlanta-based company that has undergone a series of layoffs and management changes in the past few months. Both companies are seeking to provide an interactive service between doctors and insurers that would ostensibly bypass the reams of paperwork that physicians now need to fill out.

Much of that work currently has to be done by doctors or their assistants. On the insur-

ance side, being able to use the Web to interact with health care providers is seen as a potential way to increase the timeliness of treatment decisions and the processing of claims and payments.

The founding health plans behind MedUnite include Aetna Inc., Anthem Insurance Cos., Cigna Corp. and others (see chart). But David Cox, MedUnite's president and CEO, said during a teleconference that even more firms will use the system.

MedUnite initially was called The Coalition for Affordable Quality Healthcare when it was formed last spring. According to Cox, the company has been meeting with physician groups to identify issues that create problems in their back-office operations. "If you have 10 insurance companies, you have 10 ways to handle a transaction," he said.

The technology behind Med-

Wedding the Meds

Founding health plans behind MedUnite:

- Aetna Inc.
- Anthem Insurance Cos.
- Cigna Corp.
- Health Net Inc.
- Oxford Health Plans Inc.
- PacifiCare Health Systems Inc.
- WellPoint Health Networks Inc.

Unite's effort is being provided by a group of vendors that includes Computer Sciences Corp., Deloitte Consulting, Sun Microsystems Inc. and XCare.net Inc. MedUnite said it plans to have a pilot version of the system ready by February and is targeting a launch date of sometime next summer.

The vendors will eventually

work with MedUnite to create an online conduit for doctors looking to access databases that contain prescription and patient information.

But Doug Johnston, an analyst at Forrester Research Inc. in Cambridge, Mass., said he thinks MedUnite could have a steep hill to climb in persuading doctors to use the system.

"Their debut left me unimpressed," Johnston said. "They had no [system] demos. And what makes them believe the doctors will trust the seven [HMOs] any more than they trust WebMD? Implementation will be slower because of that."

Another concern, Johnston said, is that MedUnite didn't announce any tie-ins with vendors that sell medical management software. The ideal offering, he said, would be one that lets doctors send data directly from their practice management systems to MedUnite. ■

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BRIEFS

Net Postage Discount Gets Key Support

A proposal to give users of Internet-based postage systems a discounted rate on first-class mailings received support from the U.S. Postal Rate Commission (PRC) last week and is now expected to go before the U.S. Postal Service's board of governors for a final decision. Companies that sell postage via the Internet are hoping for a 4-cent discount, compared with the cost of a regular stamp. But Matthew Robinson, a postal rates and classification analyst at the Washington-based PRC, said it would be up to the Postal Service to decide the size of any discount.

BSA Targets Piracy On Web Auction Sites

An online sting operation conducted by the Washington-based Business Software Alliance has resulted in charges against 13 U.S. defendants for allegedly selling pirated and counterfeit software through Web auction sites. Several lawsuits were also filed against defendants in the U.K., along with about 12 enforcement actions in Germany, according to the antipiracy group.

GM Web Technology Deal Falls Through

General Motors Corp. in Detroit experienced a setback in its plans to foster made-to-order mass retailing of its cars, announcing that it's dropping a proposed investment and software development deal with The Reynolds and Reynolds Co. that was aimed at providing Web-based technology and services to GM's dealers. Officials cited disagreements over funding and the value of the preferred-supplier status that Dayton, Ohio-based Reynolds was due to receive.

Garden.com Withers

Austin, Texas-based Garden.com Inc., an award-winning Web site and one of the first online retailers, is closing its garden gate. Garden.com said it "will begin a phased shutdown of the company's retail operations and the sale of its consumer business assets."

Job Fairs Lose Luster In High-Tech Age

Recruiters say targeted events still viable

BY JULEKHA DASH
PHOENIX

AS ORGANIZATIONS increasingly rely on the Internet to find job candidates, some attendees at the International Quality & Productivity Center's recruiting conference here questioned whether job fairs are still an effective hiring channel.

Kara Svehla, a human resources manager at Maxin Group Inc. in Columbia, Md., said that while her company continues to rely on job fairs, the project-management and staffing firm wants to expand its Internet recruiting methods by scouting chat rooms for potential new hires.

On the college hiring front, companies are becoming more aggressive in trying to attract students, Svehla said. Rather than simply attending college job fairs and information sessions, companies are e-mailing select students and building a relationship with them during the school year, she said.

Keynote speaker John Sullivan, head of human resources programs at San Francisco State University, told the approximately 200 conference attendees that companies can attract better candidates through more informal social events — such as beer festivals — rather than through job fairs.

Online Fairs a Better Fit

Sullivan even encouraged companies to forget other traditional staples of the talent search: résumés and interviews. He cited the example of a large networking company that invited a college engineering class to dinner and then offered every member a job. All but two students accepted.

Recruiters and corporate human resources departments need to "explore more bold and risk-taking recruiting methods," Svehla said.

Patricia Schulz, director of

human resources at Associated Banc-Corp., explained that the "best candidates don't have time to attend job fairs."

Although the Green Bay, Wis.-based company has attended information technology job fairs, these events couldn't target workers with the specific skill sets the bank needed, she said.

Schulz said she has found that IT workers prefer to use the Internet to look for work. She said her firm is considering participating in online job fairs, which often better accom-

modate candidates' schedules.

But some recruiters said they disagree that job fairs aren't effective. Teresa Matzkin, lead recruiter at Lockheed Martin Corp. in Bethesda, Md., said that career fairs allow a company to gain visibility within a community, particularly if it does a lot of hiring in a specific geographic area. But Lockheed has changed how it approaches such events.

For instance, the company now holds its own annual career fairs. This allows prospects to view a wider range of Lockheed job openings and meet with more of the company's managers than if Lockheed were just one of many

Key Job Fair Considerations

PROS:

- Firms gain visibility in a community
- Recruiters or hiring managers can prescreen candidates

CONS:

- Job fairs don't fit the schedules of IT workers
- The best candidates don't attend them

exhibitors at a job fair.

David Foote, managing partner at consultancy Foote Partners LLC in New Canaan, Conn., said he recommends that hiring managers attend such fairs because they allow a "real-time, in-person evaluation of a candidate." ■

Recruiters Open Student Hunting Season

Plan beefier bonuses, executive outreach

BY JULEKHA DASH
PHOENIX

As companies dive headlong into the fall student-recruiting season, human resources managers are trying their hand at new strategies for snaring top information technology talent. These include getting senior executives more involved in the hiring process and handing out fatter signing bonuses.

Karen Beaver, a college relations manager at Minneapolis-based Medtronic Inc. who attended last week's International Quality & Productivity Center recruiting conference here, said that her company has increased senior management involvement in luring MBA candidates from top-tier schools such as Harvard University and the University of Chicago. In some cases, the company's CEO has personally contacted candidates when a competitor has done the same.

That's just part of senior management's involvement in Medtronic's recruiting efforts. This January, the company will launch a mentoring program

that will pair MBA students with top executives.

Though many companies have been involving senior management in their recruiting efforts for years, managers' participation is becoming increasingly personalized.

For instance, in an effort to lure students who have been made offers but have yet to accept them, the president of one of Nabisco Group Holdings Corp.'s operating companies may personally call students to see how they're faring in their decision-making, said Jen Nelson, a recruiter at the Parsippany, N.J.-based food company.

For some companies, the strategy is to get students to accept job offers before competitors can make competing bids. One Internet firm in Silicon Valley recently began of-

fering college students a \$10,000 check if they would agree to sign an employment contract on the spot, according to David Cohen, president of human resources consultancy Strategic Action Group Ltd. in North York, Ontario.

Susan Runkel, a college relations manager at St. Paul, Minn.-based 3M Co., said the company has begun offering higher starting bonuses to MBA students who were 3M summer interns. In general, corporate recruiters said, they have the highest rates of recruitment success with former interns.

Companies are also lavishing students with generous perks and compensation. One major computer company is planning to offer entry-level computer science graduates \$64,000 per year, well above the average starting salary of \$43,000 for year 2000 graduates cited by the National Association of Colleges and Employers.

Other companies are offering to fund travel expenses for visiting family. But Cohen said that in promoting such star treatment, some firms may overlook the obvious in their recruiting efforts, such as talking about the company's mission and core values. ■

Making the Grade

Firms' student recruiting strategies include the following:

- More involvement from senior management
- Higher sign-on bonuses
- Perks such as flextime and travel expenses for family visits



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NETWORKS

Microsoft Showcases Its .Net Beta Offerings

Analysts say it's now up to the software company to build momentum

BY LEE COPELAND
LAS VEGAS

LESS THAN half a year after launching its massive .Net initiative, Microsoft Corp. showcased its first .Net applications and beta-code offerings at Comdex/Fall 2000 last week.

The new framework consists of various parts, including a middleware layer called .Net; a layer of software called the

More Reaction to .Net Initiative

Microsoft's .Net strategy started to seep into the consciousness of hordes of IT professionals at Comdex. While users are interested in the possibilities, they're also starting to raise practical concerns about .Net implementations.

Three IT staffers at Vlasco Foods International Inc. in Cherry Hill, N.J., said the .Net concept sounds great in theory. "Practically, it might be difficult," said Kathleen Mayes, director of IT base technologies at Vlasco.

Mayes expressed concerns about security in particular, noting that it can be a tough sell trying to get upper management to spend \$50,000 on security when existing systems are working fine.

"It's not going to take over the world," Mayes predicted.

But the potential to offer software as a service has caught the imagination of a number of companies. Mark Davis, assistant vice president of data center operations at the State Employees Credit Union in Lansing, Mich., said he could envision building into his company's Web site the means to offer members a car loan service through Ford Motor Co. or General Motors Corp.

- Carol Stiwa

Common Language Infrastructure (CLI), on which applications run; and C# (pronounced "C-sharp"), an object-oriented language for building .Net applications. All the elements of the framework were designed to transform applications into services that get shared by computers and a host of small computing devices via the Web.

Microsoft is backing its .Net initiative with \$100 million in research and development spending, said Bill Gates, the company's chairman and chief software architect.

The Real-World Test

But the success of Microsoft's .Net will also depend on wide adoption of the technology, which means moving beyond theory to really showing what it can do, according to Daryl Plummer, an analyst at Gartner Group Inc. in Stamford, Conn.

Part of Microsoft's .Net thrust at Comdex included a new interface that Tulsa, Okla.-based Dollar Rent A Car Systems Inc. built into its Web-based Quick Keys reservation system.

"What was attractive from our side was that we did not have to change any underlying code," said Larry Zucker, executive director of application development at Dollar Rent A Car, a subsidiary of Dollar Thrifty Automotive Group Inc., also in Tulsa.

Using XML and the Simple Object Access Protocol application interfaces, the application allows Dollar to expose parts of Quick Keys to airlines, giving them the ability to book rental cars, check rates and cancel reservations for airline passengers.

Dollar built the interface in about 60 days. During the next 30 days, Zucker plans to launch another Web service application based on .Net that will allow customers to tap into Dollar's reservation system via a Palm Inc. handheld device.

But not all developers in attendance are ready to make the .Net leap right now.

"One thing that concerns me is they always use the word 'expose,'" said Mark Evans, a systems programmer at Glendora, Calif.-based California Portland Cement Co. "[.Net] allows you to expose this, expose that. That sounds pretty bad, securitywise."

Everything .Net

Beating the drum for its new Web development initiative, Microsoft also made the first public beta of the .Net framework and Visual Studio.Net tools available to developers at www.msdn.microsoft.com/.net.

In addition, Microsoft formally submitted the C# language and CLI to ECMA, an international standards organization in Geneva. The standards are key building blocks that weave the various parts of .Net together, Plummer said.

Microsoft, along with IBM and Mountain View, Calif.-based Ariba Inc., also said 130 technology vendors have signed

Success Factors

Analysts and users have said the acceptance of .Net hinges on the following:

- Eliminating security concerns about swapping services via the Web
- Facilitating the development of Web services using C#, CLI and the .Net framework
- Getting companies to publish their Web services in the UDDI directory, a Web-based Yellow Pages-style B2B directory

up to support the beta version of the Universal Description, Discovery and Integration (UDDI) directory, which was launched in September.

UDDI is a centralized directory participants can register with. It's designed to help one application identify and locate services being offered by another participant.

Plummer said widespread acceptance of UDDI is important to the success of .Net but that it's too early to know whether that will happen. ▀

Carol Stiwa contributed to this story.

MORE THIS ISSUE

For more .Net news, see page 5.

Handheld Makers Adding Wireless Support

Three companies show Comdex's shift

BY BOB BREWIN
LAS VEGAS

In a race to serve the growing "anytime, anywhere" mobile computing market, Palm Inc., Compaq Computer Corp. and Hewlett-Packard Co. all introduced new wireless products and services for their respective handheld devices at the Comdex/Fall 2000 trade show here last week.

The high-profile announcements by the three hardware makers are an indication that the focus of Comdex, which has been squarely on the Internet for the past few years, is now shifting more toward wireless computing, according to Gerry Purdy, an analyst at

Mobile Insights Inc. in Mountain View, Calif.

Palm, in Santa Clara, Calif., introduced a \$39.95 mobile Internet module that's supposed to add wireless communications support to its entire line of handheld devices.

Only Palm's newest model, the Palm VII, provided wireless services before now. With the new module, users will also be able to connect their handhelds to cell phones equipped with wiring cables or infrared ports, said Bill Maggs, Palm's chief technology officer.

Palm also introduced a wireless portal called MyPalm that it said will let mobile users automatically synchronize date-

book and calendar information with home office systems while on the road. The new portal, which is due to be launched Dec. 25, will also offer access to Web sites optimized for display on handheld devices, said Barry Cottle, the firm's chief operating officer.

HP rolled out a wireless modem from San Diego-based Novatel Wireless Inc. for \$349 and unlimited Internet access priced at \$39.95 per month for the Jornada, its version of Microsoft Corp.'s Pocket PC technology.

All-You-Can-Eat Access

That kind of "all-you-can-eat" access is aimed at holding down potentially high wireless access charges for heavy users, according to Kevin Havre, a marketing manager at HP's

iAppliances division.

Compaq introduced a series of products that provide both wireless LAN and cell phone access for the iPaq, its version of the Pocket PC. Ted Clark, the firm's vice president for wireless Internet technologies, said Compaq will sell a cell phone wireless-access card priced at \$299, with unlimited access for \$60 per month.

A plug-in card that provides high-speed wireless LAN access that's based on the 802.11B industry standard was also detailed, although Clark said pricing still hasn't been set.

In addition, the company said it plans to begin testing the much-ballyhooed Bluetooth personal-area networking technology next year, using short-range wireless devices based on the Bluetooth standard as a replacement for the cables that currently connect iPaq handhelds to cell phones or printers. ▀

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REPORTER'S NOTEBOOK

A compilation of observations from Comdex/Fall 2000 in Las Vegas:

■ Crowds seemed smaller than in recent years at Comdex. Organizers expected 220,000 attendees. Most show-goers put the number at 165,000. "But [the show organizers] will just ... inflate the numbers like always," said one person in a cab queue.

■ Prior to Bill Gates' keynote, staffers worked the aisles, distributing press releases to the media and assorted members of the audience. One excerpt from the release stated, "Ninety-nine percent of the great Internet applications have yet to be written." Gates told a sold-out crowd of more than 12,000 Comdex attendees at the MGM Grand Garden Arena.

A check of the keynote transcript posted on the Microsoft site shows that Gates never said those words.

And although there were no tickets left at showtime, the event wasn't sold out. Tickets were distributed for free.

Microsoft posted a different, updated press release on its Web site.

■ BSD Unix supporters were distributing devil's horns (the devil is the symbol for BSD, as the Penguin is for Linux) to counter the loads of penguin items at the Linux Business Expo in the Sands Hotel. Each horn had a small red flashing LED. Hundreds were wearing them.

■ The Sunday night before the start of Comdex, traffic-choked Las Vegas Boulevard - a.k.a. The Strip - was even harder to navigate be-

cause of a pack of about 150 motorcycles revving their engines.

Had the Hell's Angels decided to hold their convention at the same time as Comdex? No; the bikers were flying a banner - for a graphics card company, Santa Clara, Calif.-based NVIDIA Corp.

Their destination: the Harley-Davidson Café, where NVIDIA was tossing its preshow bash.

■ Microsoft technology specialist Duane Pressley wasn't kidding when he told a Comdex session that they might need to use the "Funcoid Palette" to create complex data mappings with the company's BizTalk Server, which is slated to ship in early 2001. It'll be interesting to see if the term *funcoid* survives the final naming cut.

■ One of the more odd Comdex opportunities was a chance to play one-on-one basketball with NBA free agent Antoine Carr at the Wiworks.com booth. Carr, 39, an investor in Sandy, Utah-based Wiworks, serves as its spokesman, according to CEO Steve Hanson. Wiworks is also building the 6-foot 9-inch Carr's NBAFlooring.com site - the NBA standing for "Nothing But Awesome."

Although someone managed to construct a makeshift basketball court at Comdex, Carr's site wasn't ready for action. A visit to the site produces the following message: "Site Currently Under Construction. Please Check Back soon!"

Compiled by Carol Siwa, Mark Hall, Bob Brewin and Michael Meehan.

Microsoft Shows Off Tablet PC Prototype

Handheld running full Windows OS not expected to be available until 2002

BY CAROL SLIWA

AMONG the gaggle of gadgets making their debut at Comdex/Fall 2000 was Tablet PC, a full-functioning handheld computer from Microsoft Corp. that can be used in pad-and-pencil mode.

Chairman Bill Gates unveiled the roughly 3-lb. orange clipboard-like prototype during his Comdex/Fall 2000 keynote address. The Tablet PC, which runs on any x86

chip, will feature a full-function Windows operating system so that users can access e-mail, calendars, project files and a database.

Although a keyboard can be attached, it's not necessary. Users need only a special pen to handwrite their notes onto the electronic tablet. If users so desire, those notes will be stored and transferred to text, making them searchable.

Microsoft said it has no plans to make the Tablet PC hardware. However, it didn't

disclose which hardware makers have expressed interest.

Mark Evans, a systems programmer at California Portland Cement Co. in Glendora, Calif., said he could envision the Tablet PC being useful for employees on the road in trucks. "It would be nice if they could scribble where the action is," Evans said.

The company might also be able to tie in the ability for field workers to view invoices or Global Positioning System information or interact with the home office in real time. "I think our business would be greatly enhanced [if] everyone was on the same page," Evans said. ■

EDS Integrates Web Site Design, IT Support

New Bluesphere unit takes over 750 design customers

BY MICHAEL MEEHAN
LAS VEGAS

At Comdex/Fall 2000 last week, Electronic Data Systems Corp. announced that it's forming a subsidiary combining its teams of Web site designers with a staff of technical consultants who will work with users

on back-end information technology support issues.

The new unit was unveiled as part of a series of announcements by EDS, including several management changes affecting senior executives at the Plano, Texas-based consulting company. Called Bluesphere, the subsidiary has more than 2,500 employees and is taking over responsibility for the 750 customers that have had their Web sites designed by EDS.

Bluesphere President Brad Rucker said the new subsidiary will try to sell users on its ability to ensure that their Web pages can do real-time data exchanges with the back-office systems running their corporate applications. That could prevent companies that are looking to do business via the Web from having to bring in multiple vendors and systems integrators to work on projects, he added.

But Rucker said he doesn't expect to be without competition. Because users typically need to link their Web sites to multiple servers running a variety of operating systems and applications, Rucker predicted that other consulting firms, integrators and application-development firms "will be blowing into this market" as well.

Bluesphere said it plans to operate as an outsourcer, offering temporary staffing and project-management services as part of its Web design and IT support mix. In addition to targeting corporate users, the EDS subsidiary said it plans to seek business from government agencies looking to do online processing of things such as driver's license renewals and tax payments. ■

Continued from page 1

ASP Rules

start marketing something that isn't real, because you will hurt the market for all of us."

Grey said she expects that more than 1,000 companies will enter the ASP market during the next decade and that the industry will need to be scrupulous about how it conducts its business.

The consortium ranked security as the chief concern of ASP end users, and it now has a best-practices guide to network security, platform security and integration security.

"We're more secure than the typical end user's own network," said Jim Kirchner, president of The LearningStation.com, an ASP in Charlotte, N.C., that runs applications for schools from kindergarten through grade 12. "The problem is in getting the end users to believe that."

ASP executives agreed that for the market to take shape, they will need to continually refine the security and service-level agreements they offer their customers.

"To date, it's been a lot of people stabbing at it in different ways," Kirchner said.

The Wakefield, Mass.-based ASP Industry Consortium also

released an executive summary of its dispute-resolution guidelines. The group anticipates short-term consolidation in the ASP market, along with disputes over data ownership, data transfer and software ownership.

"As an industry, we are going to have to be nimble," said Karen Styres, vice president of marketing at Resonate Inc. in Sunnyvale, Calif. She noted that service-level agreements must be comprehensive rather than selective.

"Customers don't want to hear it's a network issue or a server issue; the agreement has to incorporate the whole system," Styres said. "Of

course, it gives people a lot more to complain about, and that's why it's important for the ASP industry to address these issues before they become problem areas."

Styres said it's still early for the industry to work from a set of common standards but that it's important for ASPs to understand what their competitors are doing to add surety to the business model.

Grey stressed that the industry must be focused on customer service if the ASP model is to flourish.

"These [consortium guidelines] are great starting points, and you're crazy if you don't follow them," she said. ■



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Attorneys Debate Making Cybercrime Laws Tougher

Lawyer says stiffer sentences may backfire

BY DAN VERTON
CHICAGO

A LEADING criminal defense attorney who specializes in cybercrime stunned a crowd of industry security experts last week, charging that computer crime laws are too vague and that tougher penalties for hackers would do little to enhance security.

"Without clarity in the criminal law, we don't know what our goals are," said attorney Jennifer Stisa Granick, speaking at the San Francisco-based Computer Security Institute's 27th Annual Computer Security Conference and Exhibition. She added that some of the proposals now being debated are fraught with problems.

For example, Granick argued that harsher sentences for hackers wouldn't serve as a deterrent. "When people do the crime, they don't think they're going to get caught," said the San Francisco-based lawyer.

She also said stiffer sentences might encourage false guilty pleas by forcing defendants who maintain their innocence to choose a two-year plea bargain arrangement to avoid the possibility of losing in court and getting a 10-year jail term.

Daniel J. Ryan, a lawyer and former director of information systems security at the Pentagon, said that while he also has never met a criminal who thought he would be caught, that's not an idea upon which to base laws. "There are organized hacker groups to which the [racketeering] laws probably can and should be applied," said Ryan.

"The penalty should match the crime and fit the harm that's caused," said David Loundy, an attorney who specializes in technology issues at the firm D'Ancona & Pflaum

LLC in Chicago. Teen-age hackers who frequently don't have a criminal motive are too often "treated as if they are the most evil people in the world," he said.

However, Granick accused the FBI of "chilling" legitimate research by law-abiding citizens. She said she has received complaints at meetings of a Chicago-based group of legitimate security professionals and hackers called "2600" that FBI surveillance has crossed the line, with FBI officials warning some members that they shouldn't be associating with certain individuals.

"People who should be beneath the notice of law enforcement" are being told that

what they're doing is wrong, said Granick.

Steven Berry, a supervisory special agent at the FBI, denied the allegations. "The FBI fully supports the right of each and every American citizen to join any group which he or she wishes to join," he said. "The FBI's only concern is when the actions of these groups violate any laws over which the FBI has been given jurisdiction."

Anthony D'Amato, Leighton professor of Law at Evanston, Ill.-based Northwestern University, said he considered attending the last meeting of the 2600 group. "If I had done so, I'd prefer being warned by the FBI to being watched by the FBI," he said. ▀

Continued from page 1

Privacy

27th annual conference of the Computer Security Institute in Chicago.

Doing that successfully requires having an accurate disclosure policy and deciding who owns the customer data, who makes decisions with respect to the use of customer data and who responds to privacy inquiries from customers and regulators, he said.

Similarly, on the technology side, companies need to look at

where and how customer data is stored, secured, accessed and transported; what processes are followed with personally identifiable information; and who approves security policies, Schwartz added.

Just as important is the need to meet a "demonstrable" standard of due care, he said. This includes deploying technologies such as firewalls, intrusion detection, log-file monitoring and data encryption.

Such issues are coming to the fore at a time when data privacy is the target of increasing scrutiny. The Federal Trade Commission, for instance, is

pushing for privacy regulations after a survey earlier this year showed that only 20% of 355 Web sites sampled offered essential privacy protection.

More than two-thirds of the 50 states are also pushing for similar measures, while existing policies such as the Health Insurance Portability and Accountability Act of 1996 are being strengthened to include tough new privacy measures.

The impact such trends have on companies depends on the nature of the industry they're in, said Josh Turiel, network manager at Holyoke Mutual Insurance Co. in Salem, Mass.

Crime Online

Recent computer crimes:

OCT. 10, 2000 Robert Russell Sanford was charged in Dallas with **theft and unlawfully obtaining access** to computers belonging to the U.S. Postal Service and other organizations.

SEPTEMBER 2000 Patrick W. Gregory, 20, was sentenced to **26 months' imprisonment** and three years' supervised release, and was ordered to pay **\$154,529.86** in restitution for conspiracy to commit communications fraud and computer hacking against AT&T Corp. and other telephone companies.

SEPTEMBER 2000 A 16-year-old from Miami who reportedly **penetrated computer systems** of the U.S. Defense Department and NASA was sentenced to **six months** in juvenile detention.

For example, insurance and health care companies in the U.S. are more likely to be immediately affected by some of the emerging privacy regulations than companies in other industries, he said.

One result is that Holyoke — which sells insurance through third-party independent agents — isn't directly collecting information from its Web site. It could start doing so, but customers will have the choice of whether to share confidential information, Turiel said.

"We don't want to put ourselves in a situation where we inadvertently misuse customer information. ... We are absolutely paranoid about privacy," Turiel said.

Open to Feedback

Atlanta-based LastMinuteTravel.Com Inc. has a privacy policy that includes feedback from the technical and marketing sides of the business. When it comes to dealing with customer concerns, the task is split between the marketing group and technology group, said Jay Ramadorai, the company's chief technology officer.

"One of the biggest challenges is the constant push and pull between [business needs for sharing data] vs. the need to honor the privacy of our customers," Ramadorai said. ▀

New Security Product Enforces Awareness

Policy templates help administrators

BY JAIKUMAR VIJAYAN

Pentasec Security Technologies Inc., a Houston-based vendor of security products, has released Vigilant Policy Center, a tool that it says will make it easier for companies to create, publish and manage security policies.

The Internet-based product comes with a starting price of \$10,000 for a 50-user license

and is aimed at providing security administrators and staff with a more consistent view of security policies and compliance requirements.

The product comes in two parts. One is an administrative component that lets security administrators create, publish and modify security policies using wording and content from templates.

A separate user site lets users log in to the policy document, acknowledge that they have read it and take quizzes to

demonstrate their understanding of the content.

Features such as these address a crucial need, said Rick Ensenbach, an information security administrator at the Children's Hospital of Minneapolis, which has tested a beta version of the product. The fact that administrators can work with existing templates to quickly define customized policies beats having to draft them from scratch, he said.

Similarly, features that allow administrators to track security

incidents, educate users and keep track of those who have read and understood security policies are crucial, he said.

"You could have all the security in place, but if your people are not aware of it and don't know what to protect or how to protect it, there is no sense protecting it at all," he added.

"It is something that has been needed. I think it will provide organizations such as ours with a very convenient way to manage the problem," agreed beta-tester Jay Dybdahl, information security manager at Lutheran Brotherhood, a provider of life insurance services in Minneapolis. ▀

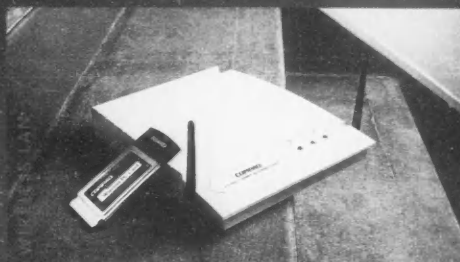
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Government Boosts Pay For Half Its IT Workers

Job satisfaction still an issue, employees say

BY PATRICK THIBODEAU
WASHINGTON

THE FEDERAL government next year will increase the salaries of nearly half its information technology workers by up to 33% — a move intended to improve the government's ability to recruit and retain employees. But while it may help make government service more attractive, it won't solve the government's IT labor hiring problems, according to federal employees.

In January, 33,000 federal IT professionals will receive pay increases ranging from 7% to 33%, the U.S. Office of Personnel Management (OPM) said earlier this month. The OPM said it hopes the pay increases will serve as a "shot of adrenaline" to boost IT hiring.

Within Range

The new salary schedule "does put us in the range of being able to attract some talented people," said Fred Thompson, program manager for IT workforce improvement at the U.S. Department of the Treasury. "[But] I don't think we're outpricing or outbidding anybody."

Federal government salaries conform to a schedule that adjusts pay based on the cost of living in different regions. For example, in the Washington area, a person just out of college without specialized skills is often limited to the entry-level GS-5 salary range, with a maximum level of about \$31,000.

But with the pay raises, which are weighted to give the largest increase to entry-level salaries, federal agencies can now offer about \$40,000 in the Washington area, said Thompson. A GS-5 in San Francisco could earn as much as \$43,000.

For young, bright people who are willing to take a risk, "I really don't think a 7% to 33% increase in salaries is going to

make all that much difference," said Ray Bjorklund, an analyst at consultancy Federal Sources Inc. in McLean, Va. "There are agencies that try to hire people right out of college, but they can't keep them."

But pay isn't be the only fac-

tor the federal government may have to address.

"Money is not the issue," said Charles McMillan, a networking expert in the U.S. State Department's Foreign Service division, in an e-mail. "The real heartburn that I have is that the State Department is outsourcing all of the interesting IT jobs and making the government employees man-

agers. I have to fight on a daily basis to maintain some technical contact with my job."

The State Department has begun using contractors to design LANs and WANs, said McMillan. The pay hikes may entice people who are on the fence about quitting or staying, but "what is needed is for those of us with the technical abilities to be allowed to engineer

OSHA Releases Final Rules For Workplace Ergonomics

One business group vows legal action

BY PATRICK THIBODEAU
WASHINGTON

The Occupational Safety and Health Administration (OSHA) last week released the final version of a set of workplace ergonomic standards aimed partly at reducing the repetitive-motion injuries that afflict many workers whose jobs involve heavy computer use. But the rules were greeted by angry industry reaction.

The National Association of Manufacturers in Washington said it and other business groups would immediately take legal action in an attempt to block the new federal rules, arguing that the standards are unscientific and could make companies liable for injuries aggravated but not caused by working conditions.

Washington-based OSHA, which first proposed the new rules a year ago, is trying to cut back on the number of workplace injuries caused by poor ergonomic practices. Some 1.8 million U.S. workers experience musculoskeletal disorders annually, with 600,000 people suffering injuries that are serious enough to require time off from work.

In total, the rules will affect more than 6 million companies

employing more than 100 million workers, according to OSHA. The ergonomic standards relate to a variety of musculoskeletal disorders, ranging from those that stem from heavy lifting to repetitive-stress injuries caused by the use of computer keyboards.

The OSHA rules don't specifically require companies to buy certain kinds of office equipment, said Peter Budnick, president and CEO of ErgoWeb Inc., an ergonomics consulting firm in Midway, Utah. But companies that have employees who are suffering from ergonomics-related injuries will have to take steps to address the problems, he added.

"To do good ergonomics in the office should not be a big burden in a company and may be a way to retain good employees," Budnick noted. In

some cases, he said, that may simply mean ensuring that a computer monitor isn't off to the side but is directly in front of an employee, or ensuring that a mouse is level with a keyboard.

Progressive employers are already taking steps to ensure that their workers don't suffer from injuries resulting from poor ergonomics, said Gary Allread, program director at

the Institute for Ergonomics at Ohio State University in Columbus.

"In my opinion, there's enough research out there to show that implementing some of these types of controls can significantly reduce workers' compensation costs," he said.

The text of the final standard is available at www.osha-slc.gov/ergonomics-standard/regulatory/regtext.html.

Food Industry Exchange Hires COO

BY LUCAS MEARIAN

Looking to add technical spice to its operations, business-to-business exchange Foodtrader.com Inc. last week announced that former Kraft Foods International Inc. CIO Nicholas Maturo is being brought in to serve as chief operating officer at the Internet-based marketplace for food and agricultural companies.

Before joining Foodtrader.com, Maturo worked for nearly 20 years at Kraft Foods International, a Rye Brook, N.Y.-based subsidiary of New York-based Philip Morris Cos. that sells Kraft-branded products in countries outside the U.S. and Canada.

He held a half-dozen management positions prior to becoming the unit's CIO, working as director of information services and in business posi-

tions such as director of procurement, logistics and customer service.

Steve Berrard, CEO of Miami-based Foodtrader.com, said in a statement that Maturo is an executive "with international brand experience [who] understands how to apply new technology to an industry that is still deeply rooted in traditional business methods."

Technical expertise at the chief operating officer level was seen as a must by Foodtrader.com executives, according to a spokeswoman at the exchange. "We looked at several candidates and felt Nick had the right mix," she said.

Foodtrader.com has been in business since 1997 and has offices in 33 countries.

Last month, the company signed a deal to work with two other food industry business-to-business exchanges. Included in that agreement is Transora, a Chicago-based online marketplace announced last spring that counts Kraft Foods Inc. — a Northfield, Ill.-based cousin of Kraft Foods International — among its 50 founding members.

Working for Uncle Sam

According to a study released last year by the CIO Council, the government will have to replace about half of its 70,000-person IT workforce by 2006.

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SAP Conversion Causing Headaches for Fabric Retailer

E-commerce venture also hurts Jo-Ann

BY MICHAEL MEEHAN

Jo-Ann Stores Inc., a \$1.4 billion chain of fabric and crafts stores, earlier this month blamed its poor third-quarter financial results on two technology-related issues: continuing start-up problems with a version of SAP AG's R/3 software for retailers and a loss stemming from the company's involvement in an e-commerce venture.

The Hudson, Ohio, company is still in the middle of a \$30 million conversion to SAP's back-office applications, a system that went live in April. But Jo-Ann said it's having trouble

keeping enough products in stock while processing re-stocking orders through the SAP Retail software.

"It's just been a very painful systems conversion," said Brian Carney, Jo-Ann's chief financial officer. "It's not necessarily the software's fault, and we're happy that our business will be running on SAP. But it hasn't been easy."

Carney acknowledged that the conversion has taken longer than the company expected and said Jo-Ann still expects to experience out-of-stock glitches in its crafts business during the current fourth

quarter. In its third-quarter financial report, the company said it hopes to resolve the problems "as quickly as possible," but it offered no specific timetable.

Jo-Ann's business operations are a difficult proposition for any retail software to handle, Carney said, with 100,000 active product items needing to be tracked at more than 1,000 stores. "We're a very large implementation for SAP," he said. "There's a constant trade-off in performance between needing speedy run times and delivering the kind of detail it takes to place our orders."

Despite the out-of-stock problems, William Wohl, a spokesman at SAP America

Inc. in Newtown Square, Pa., said the German vendor still intends to use Jo-Ann as a customer reference for SAP Retail. Such installations are a difficult science at best, he said.

**It's just been
a very painful
systems
conversion.**

**BRIAN CARNEY, CHIEF FINANCIAL
OFFICER, JO-ANN STORES**

"Since every customer is unique, once you get into these projects is when you start realizing [that] you need to change business processes," Wohl said. "Or you head off in directions that were unexpected."

David Dobrin, an analyst at Synergy Inc. in Boston, said he's not surprised that a retailer such as Jo-Ann is having problems with the installation of a back-office and supply-chain system.

SAP Retail "has always been the ugly duckling" of the R/3 product line, Dobrin said. And the retail industry in general has proved to be a minefield for application vendors, he added. "What retailers need is very specialized and very difficult to build," Dobrin said.

Les Duncan, CIO at Jo-Ann Stores, said earlier this year that the retailer had to customize SAP Retail with help from developers at SAP "to fill some big gaps" in the software's ability to keep track of seasonal products and to manage pricing and promotions.

Par for the Course

That kind of complexity and schedule slippage is par for the course on major enterprise resource planning projects, Dobrin said. "The only people who ever get those estimates [of implementation times] right are the extreme pessimists, and extreme pessimists rarely get any power in an organization," he noted.

Jo-Ann, which warned early last month that its third-quarter earnings would be below expectations, said the results also were hurt by a \$1.1 million loss stemming from a minority stake in El Segundo, Calif.-based IdeaForest.com Inc., which sells arts and crafts supplies online.

Last spring, Jo-Ann invested \$6.5 million in return for 28.5% of IdeaForest.com as part of a deal leading to the launch of an e-commerce Web site that bears the Jo-Ann name.

Carney said, Jo-Ann executives don't expect to see a profit from the deal with IdeaForest.com until the Web site's third year of operation.

In a related development, Phoenix-based Petsmart Inc. last week warned that its third-quarter financial results will be below expectations due partly to lingering start-up problems related to an installation of SAP's retail applications completed last year. ■

Oracle Joins With Citigroup For B2B

*OracleExchange.com users can now use
the bank to make electronic payments*

BY MARIA TROMBLY

CITIGROUP INC. last week said it would put "billions" of dollars of its procurement business into Oracle Corp.'s OracleExchange.com, an all-purpose online business-to-business

exchange. In addition, New York-based Citigroup has already begun to process payments for all users of the exchange.

The bank will also enable its own customers to use the exchange via a branded portal. Terms of the deal between Or-

acle and Citigroup weren't disclosed.

The deal is a sign that Oracle is getting serious about payments, said Avivah Litan, an analyst at Stamford, Conn.-based Gartner Group Inc. It's Oracle's first such deal with a bank, although in September it announced that GE Capital Commercial Services would also be providing some payment services.

However, two of Oracle's

major competitors for business exchange software already have deals with major banks.

Ariba Inc. in Mountain View, Calif., has partnered with Bank of America Corp. in Charlotte, N.C., and ABN Amro Bank in Amsterdam, Litan said. Ariba is the market leader in the space — it's ahead of Oracle by almost \$100 million in annual e-commerce sales, according to AMR Research Inc. in Boston. Ariba says 228 online exchanges use its technology, compared with Oracle's 55 users. Pleasanton, Calif.-based Commerce One Inc. has partnered with Citibank, a Citigroup subsidiary.

These alliances have helped business exchanges close their last big remaining gap, said David Medeiros, an analyst at Needham, Mass.-based Tower Group.

"One of the key elements that's been missing from business-to-business e-commerce has been the automation of the payment functions and integration of the payment function with the electronic-commerce process," he said.

Citibank's deal with two different exchanges shows that the bank itself is spreading its wings, Litan added.

According to Ann Cairns, global head of e-solutions for e-business at Citigroup, companies using Oracle can make payments now. The invoicing capability is currently being built and will be ready in the second or third quarter of next year, she said. ■

Citigroup Opens Online Brokerage

Citigroup Inc. launched its online brokerage last week. Called CitiTrade, it's a stand-alone brokerage with the latest tools, but it may not offer enough to keep customers happy, said analysts.

New York-based Citigroup currently offers two different kinds of trading. One subsidiary, full-service brokerage Salomon Smith Barney Holdings Inc., has almost 2 million customers. Another 100,000 Citibank customers use the brokerage function of the bank's online service. CitiTrade will be another stand-alone service, aimed at do-it-yourself traders and not integrated with Citigroup's other services.

"Customers will get some Salomon Smith Barney research," said

Steve Clifford, CitiTrade director. "But if they want advice, they have to open a Salomon Smith Barney account." There are no plans to integrate the services, Clifford added, though integration could come in the future.

So what will make CitiTrade stand out? According to Clifford, customers will come for reasonably priced trades — \$29.95 per transaction, similar to the rate offered by San Francisco-based Charles Schwab & Co. — and great tools. Customers will be able to pick and research mutual funds, stocks and fixed-income equities as well as plan their finances and do their taxes.

According to Clifford, CitiTrade is one of the few online brokerages in-

tegrated with Mountain View, Calif.-based Intuit Inc.'s TurboTax software, taking all the work out of filling out trading-related tax forms.

Larry Tabb, an analyst at Needham, Mass.-based TowerGroup, said many online brokers are moving to an integrated model, in which customers can access their accounts through multiple channels.

At San Francisco-based Schwab, for example, customers can open accounts at a brick-and-mortar location, perform do-it-yourself trades, talk to an advisor or receive private banking services.

"That's the real direction you see the industry headed in," Tabb said. "Citibank is going to be targeting the generic investor, and it's probably too late for that. The market has grown up around it."

— Maria Trombly

Priceline.com Cuts Automotive Unit by Half

BY LEE COPELAND

Beleaguered name-your-price Web retailer Priceline.com Inc. halved the staff of its automotive services group after posting disappointing third-quarter results earlier this month.

The outgoing head of that unit blamed the downsizing on the unsuitability of the Web for selling new cars. But analysts challenged that assertion, saying the problem is Priceline's model, which doesn't work for online car sales.

"If you look at the way their service is executed, it's not a surprise that it's not working," said Thilo Koslowski at Gartner Group Inc. in Stamford, Conn.

"Consumers want to know the lowest price, not have to figure out the price on their own," Koslowski said. "It's a complicated process for a consumer."

At Priceline.com, car shoppers can configure new vehicle models and then suggest a price, which gets sent out to dealers in numerous locations. Buyers are put in touch with participating dealers via e-mail. Priceline charges a \$50 fee for closing the vehicle sale.

After racking up third-quarter net losses of \$2 million, the Norwalk, Conn., company laid off 16% of its workforce of 535 earlier this month. Those deep cuts, estimated to include 23 of 46 employees in the automotive group, prompted Maryann Keller, president of Priceline's automotive services, to resign.

Bumpy Ride Ahead

Priceline.com isn't the only online car broker facing a bumpy road ahead. Online car-brokering rivals Autobytel.com Inc. and Autoweb.com Inc. have yet to turn a profit and have watched their stock prices plummet.

At Autobytel, in Irvine, Calif., revenue grew 65% over last year to \$17.5 million in the third quarter, ended Sept. 30, but losses widened to \$7.9 million compared with \$6.2 million in the same quarter last year.

Autoweb, in Santa Clara, Calif., posted losses of \$10.8 million on sales of \$11.5 million in the third quarter. Sales increased more than 25% for the quarter, but losses more than doubled from the same period one year ago.

Meanwhile, start-up Invoice-Dealers.com Inc., a closely held private firm in Palo Alto, Calif., claims to have generated

income of \$71,000 on sales of \$666,000 in unaudited financial reports.

To survive, online automo-

tive hawkers must provide integrated services, such as finance and insurance services, said Rob Leathern, an analyst at Jupiter Communications Inc. in New York.

"One of the big problems

with the lead referral model is that consumers get a lot of information but cannot do the difficult part of the process, which is obtaining financing from the site," said Leathern. ▀



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For the enterprise, this is a potential boon; Web-empowered customers are allowed to set their own schedules, use their own favorite medium to retrieve information, and use the Web to serve themselves, as well as deepen their relationships with businesses. Companies can even leverage existing databases and customer background, more effectively mining and deepening existing information.

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BRIEFS

Microsoft to Invest \$50 Million in ASP

Looking to plant the first seeds of its Internet-based .Net initiative in the application service provider (ASP) market, Microsoft Corp. announced a deal with USInternetworking Inc. that includes a planned \$50 million equity investment in the Annapolis, Md.-based hosting services company. The deal calls for USInternetworking to offer managed application services built on Microsoft's Windows 2000 operating system and upcoming .Net technology, with a phased rollout schedule that's due to start next month and be completed in May. The agreement was part of a wider series of deals that USInternetworking said will bring a total of \$300 million in new funding and credit lines.

CMGI Plans to Close Sites, Sell Free ISP

In an effort to become profitable, Internet incubator CMGI Inc. in Andover, Mass., said it's closing its entertainment Web site, Woburn, Mass.-based iCast Corp., and its free Internet service provider, San Francisco-based 1stUp.com Corp. CMGI said it hopes to find a buyer for those businesses, but if it doesn't, it will shut them down by the end of January. CMGI, which owns AltaVista Co., a Palo Alto, Calif.-based search engine, and uBid Inc., a Chicago-based online auctioneer, said revenue for the first quarter, ended Oct. 31, will be 3.5% lower than the previous quarter figure of \$377.2 million.

Oracle, Compaq Team Up on Net Appliances

Oracle Corp. and Compaq Computer Corp. are collaborating on an Internet appliance that's due next month through distribution partners, Oracle Chairman and CEO Larry Ellison announced during his keynote address at the Comdex/Fall 2000 show in Las Vegas. The Internet appliance will be based on the Oracle9i Application Server and Compaq's ProLiant DL360 ultrathin two-way server. The device will arrive on customers' doorsteps with its hardware and software preconfigured, pretested and preinstalled, Ellison said.

HP Earnings Fall Below Expectations

High-end server sales drop amid revenue growth, acquisition plan scrapped

BY TODD R. WEISS

DESPITE a 17% growth in revenue, Hewlett-Packard Co. last week reported that it failed to hit its per-share earnings target for the fourth fiscal quarter ended Oct. 31.

HP reported fourth-quarter net revenue of \$13.3 billion, compared with \$11.4 billion for the same period a year ago.

Earnings per share for the quarter were 41 cents on a diluted basis, excluding investment and divestiture gains and losses, the effects of stock appreciation rights and balance-sheet translation and restructuring expenses.

According to a survey of 15 analysts at Boston-based First Call/Thomson Financial, earnings per share had been expected to be about 51 cents.

Tom Kramer, an analyst at

Merrill Lynch & Co. in New York, said bad debts and write-offs in HP's services line contributed to the subpar figures for the quarter, along with what he described as "somewhat disappointing growth" in Unix server sales. The fourth-quarter results show that Unix rival Sun Microsystems Inc. "is hurting these guys a lot" in the fast-growing server market, Kramer said.

HP is preparing to ship a new high-end system called Superdome that was announced two months ago. But Sun is also getting ready to expand its high-end server line, which Kramer said makes it incumbent upon HP to quickly ramp up Superdome.

"Very frankly, it's put-up-or-shut-up time for HP," Kramer said. "If they can't make the enterprise business work right now with this product transi-

tion, Sun will eat all of their lunch."

Shebly Seyrafi, an analyst at A.G. Edwards & Sons Inc. in St. Louis, said this is the first quarter in which Carly Fiorina, who was named HP's president and CEO in July 1999 and appointed chairwoman two months ago, failed to meet Wall Street's



PRICEWATERHOUSECOOPERS' Schiro: "Market conditions" caused the company's pending deal with HP to fall through

expectations — a fact that is causing some concern among HP watchers, he added.

During the fourth quarter, Seyrafi said, HP's high-end

server sales fell 20% as the launch of Superdome loomed on the horizon. Overall, he said, HP's gross margins fell to 27.5% from an expected 30%.

Meanwhile, HP said it dropped its discussions with PricewaterhouseCoopers for a proposed purchase of the New York-based firm's consulting business. The talks — which were confirmed two months ago — were halted because the two companies couldn't reach a mutual agreement, HP said.

PricewaterhouseCoopers CEO James J. Schiro, in a statement last week, blamed "market conditions" for causing the pending deal to fall through.

For the fiscal year, HP's revenue was \$48.8 billion, up 15% from last year's \$42.4 billion, according to the company.

Fiorina said that while she is pleased that revenue growth is continuing, she is "very disappointed" that share earnings didn't also rise as expected.

Fiorina blamed the results on a "confluence of a number of issues that we now understand and are urgently addressing. I accept full responsibility for the shortfall," she said. Profitability was reduced due to margin pressures, adverse currency effects, higher-than-expected expenses and the company's business mix, Fiorina said. ■

Corel CEO Gives Lowdown On Microsoft Investment

Struggling applications and Linux distribution vendor Corel Corp. in Ottawa appears to be slowly putting its financial, personnel and product woes behind it, and with Microsoft Corp.'s assistance, Corel plans to move back to profitability while more fully embracing the Web.

Early last month, the companies announced that Microsoft was taking a stake of approximately 25% in Corel in a deal worth \$135 million, and that the pair would work together on Microsoft's .Net initiative.

IDG News Service correspondent Clare Haney spoke in Las Vegas last week with Derek Burney, the newly appointed CEO and president of Corel, about the tie-up with

Microsoft and what's ahead for Corel.

Q: How did the whole deal with Microsoft come about?

A: It came together relatively quickly ... in less than a month. In my previous role with Corel as an engineer, I had continuous discussions with Microsoft — we've used their development tools all along. Our relationship was quite good even while Corel's public relationship with Microsoft wasn't.

When [former CEO Michael] Cowpland resigned, my engineering counterpart at Mi-

crosoft, Tom Button, the general manager of their tools division, called to congratulate me and invited me to come to visit them. I spent a whole day at Microsoft listening to presentations on .Net. I was stunned at how it dovetailed into our requirements and thought we could put a deal together.

Q: Could Microsoft's investment in Corel, a Linux distributor, be seen as a way for Microsoft to have a Linux test bed?

A: It certainly looks that way. If I were Microsoft, I'd have two approaches to Linux: One, I hope it goes away or, two, let's figure out how to work with it, and I'd be opting for the second approach.

Q: What do you plan to do with the money you've received from the Microsoft investment?

A: It may be used in making



BURNEY'S PLAN: Three units and an overall strategy

acquisitions. Three weeks from now, we can tell you about that specifically. With our reorganization into three main pieces, there may be acquisitions in each unit. Each one will come up with its own strategy and then we'll have an overall company strategy.

Q: Is it still possible that Corel might spin off or sell off some of its businesses?

A: Spin-offs are possible. We're working with [international consultancy] McKinsey [& Co.] to help craft our strategy. We made it very clear that there are no sacred cows and we'll leave no stone unturned in determining our strategy.

Q: There have been suggestions that Corel will release an open-source version of its WordPerfect software suite next year. Is that true?

A: We have no plans to do so. In my opinion, open source makes sense for operating systems and nothing else. ■



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MARYFRAN JOHNSON

The Carly difference

IGAVE MYSELF AN ASSIGNMENT at Comdex in Las Vegas last week: Attend the first three keynote speeches and see what our industry's most prominent figures — our alleged visionaries — have to say about the future. So I listened to Microsoft's Bill Gates, Hewlett-Packard's Carly Fiorina and Dell Computer's Michael Dell.

One of them is a captivating speaker with a tangible vision of how the Internet will reshape our lives and surround us with new services. The other two are so hobbled by Founder's Disease that they can't stop pitching their products and whining about how important the PC remains.

The spectacle of these megabillionaires waving their hands over wireless laptops and tablet-size PC prototypes was illuminating, in a way. It highlighted the stark differences between the PC-centric view of the world vs. the Internet-centric view. The PC camp will always see technology as a series of tools that humans must learn to master, while Internet thinkers envision technology that adapts to the way people live and work.

Rather than struggling to merely bring shrunken versions of today's Web to your tiny handheld device or Net appliance, the Internet services model that Carly described presumes an "always-on infrastructure" where "anything with a chip in it is a platform to develop services." It's a world where you could, for in-



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stance, use your Internet-enabled cell phone to call up your calendar, then point the phone at a nearby printer and zap out a paper copy.

New York Times columnist Thomas Friedman calls this concept the "evernet," a kind of universal connectivity for "a world in which we will all be able to be online all the time, through some information appliance." Friedman, author of *The Lexus and the Olive Tree*, a bestseller about globalization, notes: "The more the 'net breaks free from your

desktop computer and becomes accessible from all sorts of information appliances, the closer the evernet comes."

But these are tough times for visionary thinkers. New business models are suddenly suspect, and dot-coms are dropping like autumn leaves in a stiff breeze. So the real difference in what Carly had to say at Comdex was largely lost in the din of the world's largest product showcase and bad news about HP's earnings. That's a shame, because souping up old gadgets won't give your company a competitive advantage with customers anymore. New thinking will. ■

DON TAPSCOTT

The Web doesn't have to shut out the 'small stuff'

THE NEWSPAPER and music recording industries are squandering magnificent opportunities by not promoting cheap and effective micropayment systems for the Web.

It's one of the Web's biggest shortcomings. If your business model involves selling products or services that cost less than a buck, you're out of luck.

This roadblock may seem like small change, but it's holding up billions of dollars in new e-commerce and stifling the creation of an untold number of new business models, and not just in the newspaper and recording industries.

The biggest reason MP3 is so popular is that music fans resent buying a \$20 CD if they like only one or two songs from an artist. But they would happily pay 50 cents to download a CD-quality song for unlimited personal use.

Your local newspaper would love to charge 25 cents for that great brownie recipe it published last year that you forgot to clip. Newspapers are sitting on mother lodes of salable material, if they could only come up with a way to efficiently pocket a few pennies whenever an article is retrieved.

All sorts of vendors could benefit. Now that video game consoles can be plugged into the Net, kids would happily pay 25 or 50 cents per play for different games. The business model has already been proved, because this is what legions of kids already do in video game arcades.

New businesses that were previously impractical could become viable. Research bureaus could answer how-to questions from hobbyists or retrieve corporate information for investors for a couple of bucks a pop. Unpublished authors could make their books available online at 50 cents per chapter.

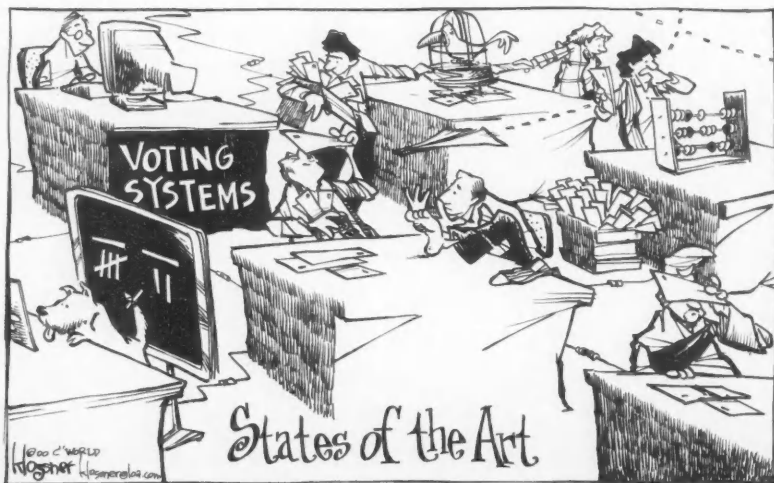
But credit cards aren't the payment solution because of their relatively high transaction costs. For purchases of less than \$5, the credit-card companies' minimum handling charges wipe out most of a merchant's profits. Moreover, many potential online buyers, such as teen-agers, don't have credit cards.

Significant riches await the companies that solve the low-cost online transaction riddle. Even if those companies made only a few pennies per sale, the volume of cash changing hands would generate tremendous revenue.

Companies such as DigiCash and CyberCash



DON TAPSCOTT is chairman of Digital 4Sight (www.digital4sight.com) and co-author of *Digital Capital* (Harvard Business School Press). Contact him at dtapscott@digital4sight.com.



tried and failed to get sufficient traction in the marketplace. Now, companies such as iPin and Qpass are trying.

But what's needed is for entire industries — such as newspaper publishing or music recording — to put their weight behind the systems. In exchange, they could co-own the systems, just as competitors in other industries are collaborating to own business-to-business marketplaces. Once the systems gained acceptance, their owners could offer the services to other online vendors.

I can just hear a newspaper publisher or recording company mogul protesting that providing micropayment services isn't part of his business model. Maybe not in yesterday's economy. But today, business model innovation is key to survival. ■

JOHN MIANO

Programmers are programmed against unions

BECAUSE OF MY recent experience in helping to form a professional association for computer programmers, I'm often asked about the prospects for expanding unions within the profession. Despite some recent well-publicized successes, such as Washtech's organization of "perma-temps" at Microsoft, the prospects for organized labor making significant inroads among programmers are bleak.

The major obstacle for unions to overcome? Programmers themselves.

They're too independent to organize, and most believe that keeping up their skills will always allow them to find jobs, so they can succeed on their own without a union's help.

Organizing the now 1,000-member Programmer's Guild during the past two years made me feel like I was herding cats. Programmers have an instinctive aversion to any form of organizing, and the resistance to joining a union is much greater among programmers than joining a professional organization like ours.

Primarily, unions and programmers don't think alike. A striking example of this disconnect is in politics. Programmers tend to be libertarian in their views and treat the two major political parties with suspicion, if not contempt. And programmers view the major labor unions as — politically — an extension of the Democratic Party, which promotes liberal social agendas that most programmers aren't comfortable with.

Unions also face changes in the nature of the

programming workforce. Historically, the vast majority of professional programmers haven't earned computer science degrees. The gap between the number of computer science graduates and the number of programming jobs was filled by employers that have given on-the-job training in programming to people from other fields. Also, employers have available a huge supply of imported foreign workers who have received basic computer training. In fact, a recent Department of Commerce report said 28% of programming jobs are being filled by foreign nationals.

A foreign guest worker's ability to remain in the U.S. is contingent upon staying employed, and that could be plenty enough to dissuade him from becoming involved in union activity. Add the fact that most of these workers depend on their employers to make green-card applications for them, and you have a solid bulwark against union activity.

To have a broad appeal to programmers, the unions themselves will have to change. Were I to form a programmers' union, it would look more

like the Major League Baseball players' union than the UAW. It would have to allow great flexibility for individuals, letting workers negotiate their own salaries within an overall framework, for example, rather than trying to lump everyone with the same job title into the same pay scale.

While unions have the potential to benefit a large segment of the programming workforce, I expect them to make very small gains during the next few years. Their most likely successes will be among organizations where unions already have a strong base. Unions also may be able to take advantage of intense company-specific issues, such as when IBM changed its retirement plan to the detriment of older employees or Microsoft's use of perma-temps to avoid paying benefits.

In order for unions to organize programmers, they must find a strategy for dealing with the increase in the use of temporary workers, and they must market themselves to programmers in such a way that the benefits of union membership clearly outweigh the perceived liabilities. ■

READERS' LETTERS

Dot-not-quite

WE AT ARRAKIS have the best of both worlds

["Harvesting the Dot-com Discontent," *Business*, Oct. 30]. We have the look and feel of a dot-com start-up (pool table, foosball, nap rooms), but as a subsidiary of J.P. Morgan, we don't have to worry about where our next paychecks are coming from.

The best part of this combination is that our chief operating officer can be here leading rather than out pounding the pavement for venture capital money.

Jennifer Brown
Recruiter
Arrakis
Cambridge, Mass.

Forgotten groupware

IN "E-MAIL WEB Clients Face Off for Users" [*Technology*, Nov. 6], Robert L. Mitchell implied that the groupware race has boiled down to Outlook vs. Notes, when in fact, both these products are trying to provide what Novell has been providing in GroupWise for some time and is enhancing in the next release.

There was no mention of

GroupWise. I suspect that is because you couldn't make the case for the others if you also considered GroupWise.

GroupWise has always provided the best return on investment. The next release will provide significant advances in programming capabilities, feature set and back-end enhancements that improve ease of administration and take advantage of technology such as clustering and SANs.

Eliot Lanes
President and CEO
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Make markets secure

IF WE DON'T know how to build e-marketplaces, how are we going to secure them and protect multibillion-dollar financial transactions? ["Marketplaces Are Tough to Build," Page One, Oct. 23] For such transactions, e-mafias and e-hackers are ready to spend millions to get a piece of the pie. I'm saying this not to slow down the marketplace momentum, but to suggest that e-marketplace builders consider the security and potential liability issues as part of the initial de-

sign. If they don't, we will be in for future surprises.

Athmane Nouiouat
E-business solution architect
Foster City, Calif.

Net responsibilities

IN HER column "Don't Overreact" [*Technology*, Oct. 9], Deborah Radcliff expresses concern that policies like those at Speakeasy Network could result in "the exclusion of everyone except the technically literate" from the Internet. While this is a valid concern, it ignores the fact that what is happening now — technically illiterate people running machines with fast connections to the Internet — is a threat to the Internet at large. The distributed denial-of-service attacks on Yahoo and CNN were the result of hackers who get easy access to large numbers of insecure machines on fast connections. Since this is, ultimately, the ISPs' responsibility, ISPs will have to either make sure their customers secure their machines or be behind a secure gateway/firewall.

Until client software and operating systems are secure, being on the Internet, especially on a fast connection, will in-

volve a certain amount of responsibility. For those unable or unwilling to accept that responsibility, there's always WebTV.

Case van Rij
Systems administrator
Seattle

Salary survey source

ONE alternative source of information to those mentioned in David Foote's column ["The Flaws Behind IT Workforce Salary Surveys," *News Opinion*, Nov. 13] is Janet Ruh's Web site, Realrates.com, which provides up-to-date rate and salary information. This data is far from perfect, but it is timely and free of much of the biases raised by Foote.

Tom Dratler
Principal consultant
Dragonriders Consulting Inc.
North Miami Beach, Fla.

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COMPUTERWORLD welcomes comments from its readers. Letters will be edited for brevity and clarity. They should be addressed to Jamie Eckle, letters editor, Computerworld, PO Box 9171, 500 Old Connecticut Path, Framingham, Mass. 01701. Fax: (508) 879-4843. Internet: letters@computerworld.com. Include an address and phone number for immediate verification.



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JOHN GANTZ

Jump on the P2P bandwagon

EVERY DECADE or so, a new technology comes along that pits IT professionals squarely against their customers. It was the display word processor in the 1970s, the PC in 1980s and the Internet in the 1990s.

Just as the IT profession squares away its methodologies to help end users deal with a new technology, something else comes along that allows end users to do the work themselves.

And they do the work in an undocumented, badly designed and nonstandard fashion. Years later, the IT professionals have to bail them out, knitting together badly designed user systems into some sort of corporate whole. Stand-alone

PCs become workstations on a LAN, department Web sites become a corporate intranet, and so on.

It's going to happen again with peer-to-peer (P2P) computing.

Although P2P has been around as a computing architecture for years, it only recently entered the common lexicon with the lightning-fast adoption of the Napster MP3 sharing program. As of last month,

Napster, the brainchild of a 19-year-old college student, had 35 million users. Often, more than a million users are trading MP3 files at a given time. It takes only nine people to manage the Napster server, which keeps only the user directory, not music files.

Anything that catches on this fast in the consumer world is bound to have some spillover application in the business world. Whatever that is, it's bound to drive IT professionals nuts.

But I'm not sure what the applications will be.

Intel came out as a big advocate of P2P in its August developers' forum and has formed an industry working group to promote the architecture. Network Associates uses P2P to distribute virus updates inside the firewall with its Virus-San ASaP product, which was released last month. Ray Ozzie, the original developer of Lotus Notes, has launched Groove Networks, a company offering P2P-based collaboration tools.

And visionaries have talked about using P2P for everything from online auctions and updating product catalogs on online trading exchanges to distributing massively parallel jobs such as weather forecasting, graphics rendering and Internet searches across multiple inactive PCs along the lines of SETI@home [Business, July 3].

Merrill Lynch, in a research brief titled "The New Economy — 2000," talks about P2P as the

new form of the Internet. And at a conference of CIOs last month, attendees selected Paragon Computation, developer of the Frontier P2P Internet computing platform, as the winner of a contest among 100 companies chosen for having new technologies that CIOs should be aware of.

Something's afoot. We may not know just what it is, but it's clumping around out there, getting ready to come in. Will it be friend or foe? Whenever I ask analysts or industry people about P2P, the biggest reason cited why it might not be as big in corporations as Napster is on college campuses is the resistance expected by IT professionals. P2P is too, well, anarchic!

But jump on P2P, and stay ahead of the curve! Learn everything you can about it, try a few applications in pilots, get your arms around it before your internal customers do, and become your company's expert on it. You'll either catch the wave, if there is one, or you'll know how to protect yourself if there isn't one. Just don't get caught flat-footed. ▀

WILLIAM M. ULRICH

E-integration needs business integration

THE NUMBER OF vendors supporting e-business integration requirements is growing at an astounding pace. Almost 200 vendors fall into the e-business and application integration (EAI) category. While they offer a variety of products and services, they have one thing in common: They treat integration as a technical issue that can be addressed with technical solutions. But this approach ignores the root cause of the integration challenge — the lack of integration within the business infrastructures that IT supports.

Here's why business integration is key to e-business integration. A telecommunications company with 18 billing systems or a bank with 25 customer databases didn't get that way by design; they were created as these companies grew through consolidation and other business activity. These examples reflect a growing lack of cohesiveness within the business units themselves. Mergers, acquisitions and antiquated management infrastructures spawned organizational and procedural redundancies that evolved into today's IT integration challenge.

To put this into perspective, let's outline the formidable task that's facing IT organizations. Web-based applications require common data views and a seamless transaction flow, which legacy environments don't support. IT must find a way to

address the inherent fragmentation, redundancies and inconsistencies found within legacy data and system architectures to support e-business projects. For example, real-time access for an order being taken over the Internet requires the triggering of a series of back-end inventory, shipping, billing and accounting transactions that were never designed to function in Web time. The data and systems that are needed to fully execute this type of transaction span multiple databases, systems, users and environments. Similar challenges exist in online banking, telecommunications, manufacturing and other industries.

Integration vendors offer tools to address some of these requirements. Data-integration tools consolidate legacy data across multiple databases and deliver this information to Web-enabled users. This is a useful approach, but it has limitations. Inconsistencies in data formats make it difficult to know which data meets certain criteria. And software tools can't determine user-defined data variances. For example, one division of a hardware company logged the sale of a PC, mouse and CRT as a single-unit purchase, while another division logged the sale as a three-unit purchase.

Integration tools can also connect application systems with Web-enabled front ends. These tools allow Web-based systems to trigger one or more back-end transactions via a complex series of message brokers, routers, transformation tools and other software. But legacy architectures were never designed to support seamless transaction flow, and the tools can't fully alleviate this limitation.

Regardless of the near-term value of these integration tools, underlying data and systems will continue to grow more fragmented over time. As this occurs, IT will be required to introduce more layers of technology to support future integration requirements. Eventually, these integration solutions will evolve into an unmanageable labyrinth of Web-to-legacy interfaces that will stifle future e-business initiatives.

To avoid this fate, look beyond technical integration issues, and address the lack of cohesiveness within the business infrastructures and processes that drive these legacy systems. That attacks the root cause of the e-business integration challenge.

Teams of business-unit and IT professionals should examine e-business requirements from a businesswide perspective. Then they can build a plan to selectively utilize tactical integration tools for the short term, then deploy more long-term systemic solutions. Processes, systems, databases and organizational infrastructures should be integrated and realigned to support ongoing e-business requirements. This might, for example, require consolidating 18 billing systems into three, streamlining billing processes, combining business units and realigning IT support structures.

E-business integration requires solutions that deliver short- and long-term value. IT must work with business units to deploy business-focused integration solutions. In doing so, you'll avoid creating a legacy integration nightmare that could disrupt future e-business initiatives. ▀



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WILLIAM M. ULRICH is a management consultant and president of Tactical Strategy Group Inc. Contact him at www.systemtransformation.com.

READERS' LETTERS

Past, present federal employees: IT pay isn't the problem

AS A FORMER federal employee of 15 years, I can assure you that pay may be the carrot, but it is the timeless faults of government that are the driver that pushes quality employees out ["Federal IT Pay Increase Not Expected to Fully Solve Hiring Problems," *Computerworld.com*, Nov. 10].

For a quality employee, what ultimately grates is the other 20 employees paid as much or more than do half as much work. Subsequently, managers find they are incapable of tackling the difficult challenges competitively because of the extraordinary overhead and incompetency of their staff. It logically follows that the best and most interesting work must be contracted.

I left six weeks' vacation and \$75,000 a year, not because of money, but because I had run out of challenges. Instead of boosting retention, a pay increase will increase downsizing as IT will be completely incapable of justifying the cost of its own staff.

Mark Stieg

Data architect

Copic Cos.

Denver

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to about \$60,000 because "payroll funds were not available." In one case, after an employee left for another agency where funds were available, the employee's position was filled by a contractor whose firm billed the government \$260,000 a year for the same job. But management was in line for sizable bonuses because they had "reduced payroll expenditures while still meeting mission objectives."

Robert Wright
Centers for Disease Control and Prevention
Atlanta

AS A FORMER IT employee of the government (Department of the Air Force), I can tell you that job satisfaction, not money, is the primary problem. Large pay raises to IT professionals will help, but government bureaucracy, particularly in the Department of Defense sector, inhibits innovation and creates frustration. My husband is an IT professional with over 25 years' service to the Air Force and looks forward to retirement because he has no job satisfaction and no sense of accomplishment. It's

only a little better for the government contractor; we are frequently reined in from designing the best solutions.

Lydia Decker

Associate system engineer
Colorado Springs
ldecke@stai.com

Data tools have limitations

"CALLING ALL Data" [Oct. 16] was interesting but left out a number of considerations as to why many companies can't use the new types of tools.

1. Do you really want hundreds of end users doing analysis of millions of rows asking queries into your transaction system, which is probably already underdesigned? I think not.

2. Do you have multiple definitions of the same object (Gender = M/F; 0/1; 1/2) that need to be interpreted in the product each time a user runs a query? I think not.

3. Do you have multiple applications that have different definitions for customers using different data types? If so, how is that handled within the product you are using? Do you really want that product to interpret "12345" to be different things to different systems? I think not.

4. Do you really want to keep 10-plus years of history in a transaction system, slowing it down? I think not.

5. Are your measurements in different metrics (currencies, metric vs. U.S. measurements). Do you really want conversions on the fly? I think not.

6. Do you really want to process the same set of requests every time a user issues a query? I think not.

Granted, if you have a small single application that has an integrated environment (as very few do), then these products may work (though I would still be leery because of No. 1 above). But as for replacing the data warehouse, I think not.

Chuck Kelley

President and chief technology officer
Excellence In Data Inc.
Surprise, Ariz.
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Programmer concerns need to be heard

ISTRONGLY disagree with Morton Bahr's assessment of the value of unions in the IT field ["Unions Have a Role in Today's New Economy," *News Opinion*, Oct. 9].

As a child, I watched my father go on strike with no benefits while the union leaders still received their full salaries and drove to the strike in

Cadillacs. As a college student, I worked in a theater at minimum wage but was forced to pay dues to a union I didn't want to join.

I can see where a union might help people in operations, repair and the help desk, where salaries are low, demands are high, and appreciation doesn't exist. However, to suggest that unions could help everyone in the New Economy is wrong. Unions are a last resort for people whose individual efforts aren't recognized, which is currently not the case for programmers.

Programmers are by nature competitive. However, this desire to compete can lead to burnout if a company tries to take advantage.

Before the programmers in your company go to unionization, make sure the demands put on them are no more than those on anyone else. While they can, programmers will leave such environments, but the other alternative, unionization, will continue to loom if programmer concerns aren't answered. This isn't a threat from someone who wants unions, but a promise from someone who's been there.

Aaron Fager

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IAGREE with the comments by the Department of State's Charles McMillan regarding the government's habit of outsourcing the interesting work. But competence is not necessarily a criterion used for outsourced professionals. I have seen numerous situations where it was acknowledged that the contractor personnel were abysmally underskilled, but they were given the opportunity to gain experience and classroom training that the government employees weren't allowed. Other times, contractors botched the job, and government employees had to correct the problems. Then the contractors got congratulations for a job well done.

I have also seen situations where government "computer specialist" employees were denied grade and pay increases from about \$54,000 a year



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BUSINESS

AVOIDING LEMONS ONLINE

Online used-car dealers are hooking up with Saturn, The Pep Boys and other brick-and-mortar firms that can do real-world vehicle inspections for online auctions. Potential buyers are suspicious of used cars, and a multipoint inspection can be reassuring. But it's not clear whether the deals make any money for the inspectors. **▶ 38**

A PUSH FOR SALES AUTOMATION

Small companies have long found themselves unable to afford the efficiencies that high-end sales-force-automation software can provide, Pimm Fox writes. The ability to track leads and reconfigure sales forces based on current information is appealing enough to users to drive growth in sales of such automation products at a rate of more than 40% per year. But new application service providers may make sales force automation more accessible and change the market for the big boys. **▶ 38**

SETTING GOALS

The biggest problem in any IT project is setting the goals and specifications, Ed Yourdon writes. He advises having users create "light" and "heavy" spec sheets, each of which looks at not only what users want, but also how well they understand the requirements and what will happen if the system doesn't work the way they expect it to. **▶ 40**

WORKSTYLES

OK — so the Salvation Army isn't the sexiest place to work, but it does have sophisticated systems to track donations and logistics systems that can get a truck to a donor quickly, just like cutting-edge shipping companies do. Its management and IT stack up against those of any Fortune 500 company, and the job offers the added benefit of improving people's lives, not just the company's bottom line. **▶ 40**

CRAZY LIKE A FOX

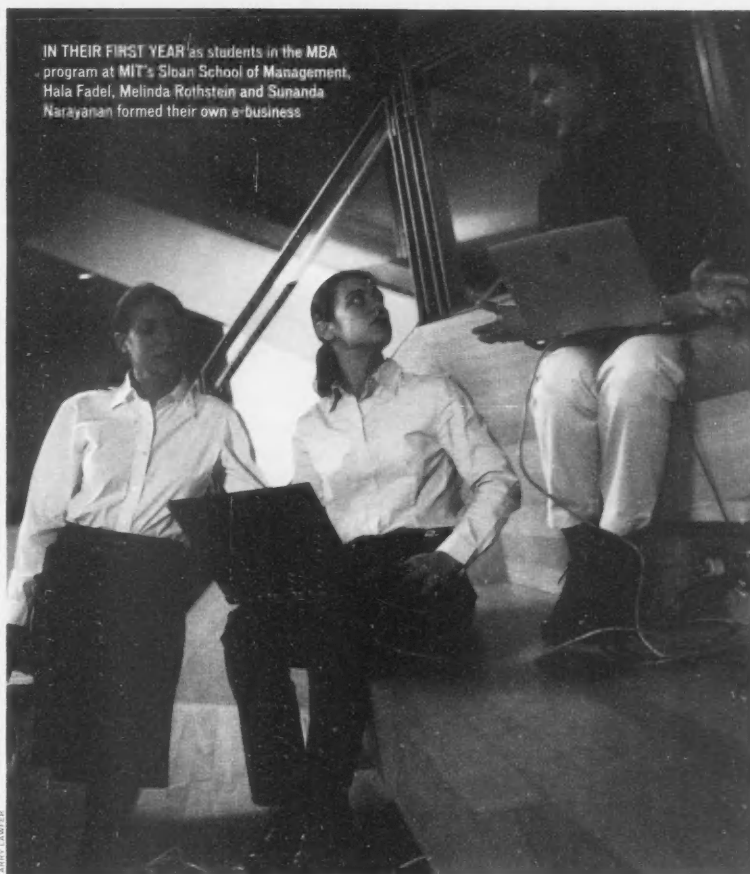
Analysts thought Enron was crazy to start an online trading site for energy. But one year and \$183 billion in transactions later, their opinions have changed. After taking some risks, the company has transformed itself into the leading market maker among the B2Bs. **▶ 44**

QUICKSTUDY

Just-in-time manufacturing can deliver huge savings, but it doesn't always require that companies implement high technology; Toyota has done it in a low-tech way. But Toyota, Ford and other manufacturers are making themselves even more efficient by using Web technology to make planning more accurate and supply chains more effective. Those companies may also be able to create a build-to-order capability that some PC vendors are touting. **▶ 50**

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IN THEIR FIRST YEAR as students in the MBA program at MIT's Sloan School of Management, Hala Fadel, Melinda Rothstein and Sunanda Narayanan formed their own e-business.

MASTERING E-COMMERCE

E-COMMERCE EXECUTIVES are desperate for guidance on how to run their businesses, and American academia has discovered that need. Major business schools are striving to meet the demand for information about how to make an online business succeed and, in the process, are trying to figure out how exactly to teach a science that changes almost too fast for teachers to keep up.

48

Online Used-Car Sellers Turn to Real-World Mechanics

Attempt to limit lemon factor, hassle

BY LEE COPELAND

It's virtually impossible to kick tires, gun an engine or check the oil online.

That limitation has led a number of Web-based used-car shopping sites, including Chicago-based Cars.com Inc. and San Jose-based eBay Inc., to team with brick-and-mortar mechanic and inspection services to help customers reduce their chances of buying a lemon online.

If a franchise dealer sells an off-lease Lexus, customers can expect that car to have been inspected and certified by the dealer, said Jonathan Gaw, an analyst at International Data Corp. in Framingham, Mass.

"eBay and Cars.com do not have a history of excellent mechanic services, so in order to sell a used car, they need to provide some confidence that it meets a gazillion-point check list," said Gaw.

Earlier this month, Cars.com launched a pilot program under which Freemont, Calif.-based BestOffer.com Inc. will offer 108-point inspections to customers in Los Angeles, Sacramento, San Diego and San Jose.

BestOffer.com is a start-up itself that launched its mobile vehicle inspection service and auction site in the San Francisco area last November.

BestOffer.com, which is backed by \$17 million in venture funding, maintains a fleet of 30 vans equipped with inspection gear and a Web site on which it auctions the cars



START-UP BESTOFFER.COM runs a mobile vehicle inspection service with its fleet of 30 vans in California. It also launched an auction site

it inspects. It dispatches its mechanics to customers' locations to evaluate the vehicles and then charges 2% of the final price on vehicles sold within 45 days through its site.

"This [deal] is about delivering a better experience and taking the hassle out of selling used cars," said Jeff Reed, president of BestOffer. Reed said his firm has performed more

than 5,000 inspections thus far.

In general, big-brand national automotive services retailers have shied away from similar dot-com deals. But daring bids to capture consumers' notice and incremental revenues have gotten Saturn Corp. in Spring Hill, Tenn., and The Pep Boys — Manny, Moe & Jack in Philadelphia into the game.

A 29% drop in sales last year and a quest for new revenue prompted Saturn to strike a deal with eBay under which its dealerships will perform 30-minute, 135-point inspections on any make of used vehicle on eBay's automotive site.

The General Motors Corp. subsidiary was gambling that the \$100 inspection service would attract more foot traffic from potential car buyers at its 400 retail stores.

Five months later, "we're moving ahead with the project, but not at a rapid pace," said Bill Betts, a Saturn spokesman. "There have been relatively few instances where we have interacted with a customer and gone ahead and done an inspection, but they have been done."

Big auto retailers are cautious about doing deals with dot-coms because they stand to lose a lot in customer confidence if the service and execution from the start-ups is below par, Gaw said.

"One problem is that there is not a lot of money to be made in the inspection business, and it's a hassle to develop a program that's not going to generate large revenues," Gaw said.

Pep Boys also launched a dot-com pilot program last month with StraightAway, a Naples, Fla., start-up that assists car owners in pricing their used vehicles, undertaking repairs and getting registered on auction site AutoTrader.com. StraightAway operates from kiosks in nine Pep Boys stores.

In July, Pep Boys launched its own 200-point vehicle inspection program in all 627 of its automotive shops.

These types of services are trying to bridge the gap between the online world and the used-car market, said Rob Leathern, an analyst at Jupiter Research Inc. in New York. "It's a little different with used cars," he said, "because there's a difference in quality and the state of the vehicle."

PIMM FOX/VOICE FROM THE VALLEY

IT services for rent

BIG COMPANIES have always had the benefits of more IT firepower. Look at the sales force automation systems that are deployed for thousands of sales reps.

Now that technology edge — expensive and complex — is being tailored for the midrange business market through application service providers (ASP).

With ASPs, customers get the sales force automation services they need without purchasing IT systems, says Denis Pombriant, a senior analyst at Aberdeen Group Inc. in Boston.

He says government figures show there are 8.9 million U.S. companies with revenues of \$20 million or less.

For them, the benefit of distributing time-sensitive sales data as well as individual sales information about accounts and clients seems

obvious. Yet cost has inhibited many from investing in any sales force automation tools.

Pombriant says that paying \$50 a month per seat to use a Salesforce.com service would be more manageable than buying an entire sales automation system.

The heady growth rate in the sales of such systems remains steady — 42% last year, to \$1.65 billion, and about the same amount of growth as this year, according to Pombriant.

Those numbers confirm that businesses see the value in spending to automate their sales forces.

Even tools such as e-mail can easily be considered

sales force automation tools, after all.

But San Francisco-based Salesforce.com is offering a different experience.

Using its own IT talent and servers, Salesforce.com gives companies lead management, contact

management and account information; all the different tools used in the sales process such as forecasts and reports are integrated online for a monthly fee.

Salesforce.com and competitors such as Boston-based Mynet-sales.com Inc. target companies that want to focus on selling, not the technology needed to help them sell.

By using the tools an ASP supplies and maintains, sales managers are able to analyze data from their sales forces that will keep them

up-to-date on activity with customers. Giving managers an overall picture of an entire territory online can help them schedule meetings more efficiently and can cut down on the amount of time salespeople are brought in from the field for meetings and reviews.

Could companies such as Salesforce.com take a bite out of the large players in sales force automation like Siebel Systems?

Absolutely, as the cost and complexity of sales force automation continues, many firms will opt to rent rather than buy — cutting the risk of investing in a long-term solution that may or may not be viable in a couple of years.

Enterprise sales automation software from Siebel isn't democratic, says Marc Benioff, chairman and founder of Salesforce.com. He contends that only the rich have had access to it. He says Salesforce.com can help change that. ▀



PIMM FOX is Computerworld's West Coast bureau chief. Contact him at pimm.fox@computerworld.com.

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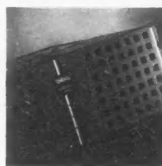
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WORKSTYLES

What It's Like to Work at... The Salvation Army

Interviewee: Clarence White, information technology secretary (equivalent to a CIO)

Company: The Salvation Army USA Western Territory

Web: www.salvationarmy.usawest.org

Main location: Long Beach, Calif., for the territory covering 13 western states; U.S. headquarters is in Alexandria, Va.

IT structure: Each territory has its own IT operation, but "we coordinate on issues of national scope, like messaging and Internet fund-raising."

Number of IT employees: 65 dispersed across the Western Territory

Number of employees (end users): 4,500 in the Western Territory

Mission-critical systems (in the western territory):

Great Plains Dynamics for financials and accounting.

"deployed across a wide-area network that reaches close to 500 different locations, from corporate headquarters to the smallest entity in the most isolated town"; a homegrown donor-management system to manage mail campaigns and Internet fund-raising; and a donor-services system for the thrift-store organization.

"Anyone who wants to donate gifts in kind calls 1-800-95-TRUCK, and the system dispatches trucks to collect donations all over the West. The trucks have onboard computers for routing and dispatch, and they have [Global Positioning System] indicators, so we always know where they are. All of their activities are tracked to minimize the opportunity for shrinkage - even though we're a charity, people will steal from us."

IT training for next year: Lotus Domino R/5 and Windows 2000 Active Directory.

"Integrating the Domino directory with Active Directory is our big technology thrust for 2001."

Employee reviews: "We set goals for every employee annually and weight the goals against each other for their relative importance. At the end of the year, we rate their performance toward achieving those goals and then multiply the weight by the rate and come up with a score. The scale is from

0 to 5, and they usually score between a 3 and a 4."

Compensation and bonuses: "We would not be considered very aggressive on compensation. Most people who work here feel good about the organization and are accepting of [lower] compensation."

Workday: Officially, 8:15 a.m. to 4:15 p.m., "but anytime from 6 a.m. to 8 p.m., the coffeepot is on. We're tremendously busy with ongoing applications development and support - it never stops."

Kind of offices: Cubes and offices; IT occupies about half of the fourth floor of a new 12-story headquarters building.

Little perks: "Lots of departmental celebrations when we reach a major milestone. We do lots of back-patting and feeding of faces."

Last companywide/department perk: Dinner at an Italian restaurant after completing the move to the new headquarters in July. The Christmas party will be dinner on the *Queen Mary*.

Would employees feel comfortable e-mailing territorial commander David Edwards? "Yes, but it wouldn't happen very often. He has a very big interest in IT and regularly comes down to our floor."

What's the biggest misconception about working at The Salvation Army?

"Probably that we're unsophisticated and not very organized. It's quite the contrary. I think we've applied the very best of business management and IT to solve real-world social problems."

What do you like best about it? "It's very much like working in IT in any Fortune 500 company; however, when

you actually go to the inner cities and see what we do, you really feel good about what you do for a living - much more so than if you were just doing it for shareholders. Every so often, I bring our IT people down to skid row in Los Angeles and show them what they're supporting and how it impacts people's lives. You feel good at the end of the day when you see your work in that perspective."

- Leslie Goff

(lgoff@ix.netcom.com)

ED YOURDON

Write stuff for users

IF AN IT PROJECT TEAM doesn't understand the requirements for a system, it doesn't matter if it's using the latest object-oriented methodology or development tools. Ideally, the team could create a requirements document entirely on its own, but since systems are built at the request of business-unit end users, the document can't be created without their input. So, why not have the business users document the requirements, with the IT project team reviewing them for completeness and consistency?

How can we help users accomplish this?

The most important thing is to persuade them that it's worth the effort. Techniques and procedures are useless if the users complain that they're too busy to waste their time on "that technical stuff." Anyone who has interacted with a contractor to remodel a kitchen knows that it's crucial to describe requirements as specifically as possible. Unfortunately, many end users haven't had that bitter experience in IT; after the second or third disaster, they're usually more amenable to the suggestion that they get deeply involved. But that's hard to do the first time around.

Even if users *do* agree to invest time and energy in writing system requirements, their time is limited. No matter how enthusiastic they may be, they won't have time to attend a five-day requirements-writing class and then churn out 900 pages of documentation. Thus, one question the IT project team must ask about each requirement is: "What happens if we don't get this right? If you document the requirement incorrectly, or if we don't understand it properly, how bad will it be? Will lives be lost? Or will it be a minor nuisance that can be corrected later?" This allows the users and the project team to prioritize their efforts and write a "light" document for systems requirements that don't matter much, and a "heavy" (or formal, rigorous and detailed) document for requirements that will have a life-or-death impact on the business.

The next question to ask business users is, "How well do you understand your requirements?" Software-engineering literature often assumes that users understand their requirements perfectly and that the problem is simply one of articulation and documentation. But if the users say, "No matter how much thinking I do about the situation, I really

won't know my requirements until I see how the system works in the real world," then we're kidding ourselves if we try to force them to document their requirements in mathematical equations. That's why the idea of building several interim prototypes - in order to get feedback and confirmation of the "real" requirements - is so popular, but the trick is to reserve prototyping for situations in which it's needed, rather than using it as an excuse to avoid documenting what we do understand.

Finally, while reviewing the requirements document that the users have drafted, we need to ask, "How would you test the system in order to ensure that we've successfully implemented this requirement?" This is one of the basic tenets of the XP (extreme programming) movement, but it's often interpreted as a discipline for programmers to use among themselves - that is, no code shall be written before the test case is created. But if we broaden this concept, we can get users and business analysts involved in the same process: Write the "acceptance test" before writing the specification. This helps expose ambiguous and unacceptable requirements such as, "The system shall be user-friendly," because the people who write such statements have rarely thought about how a system would be tested.

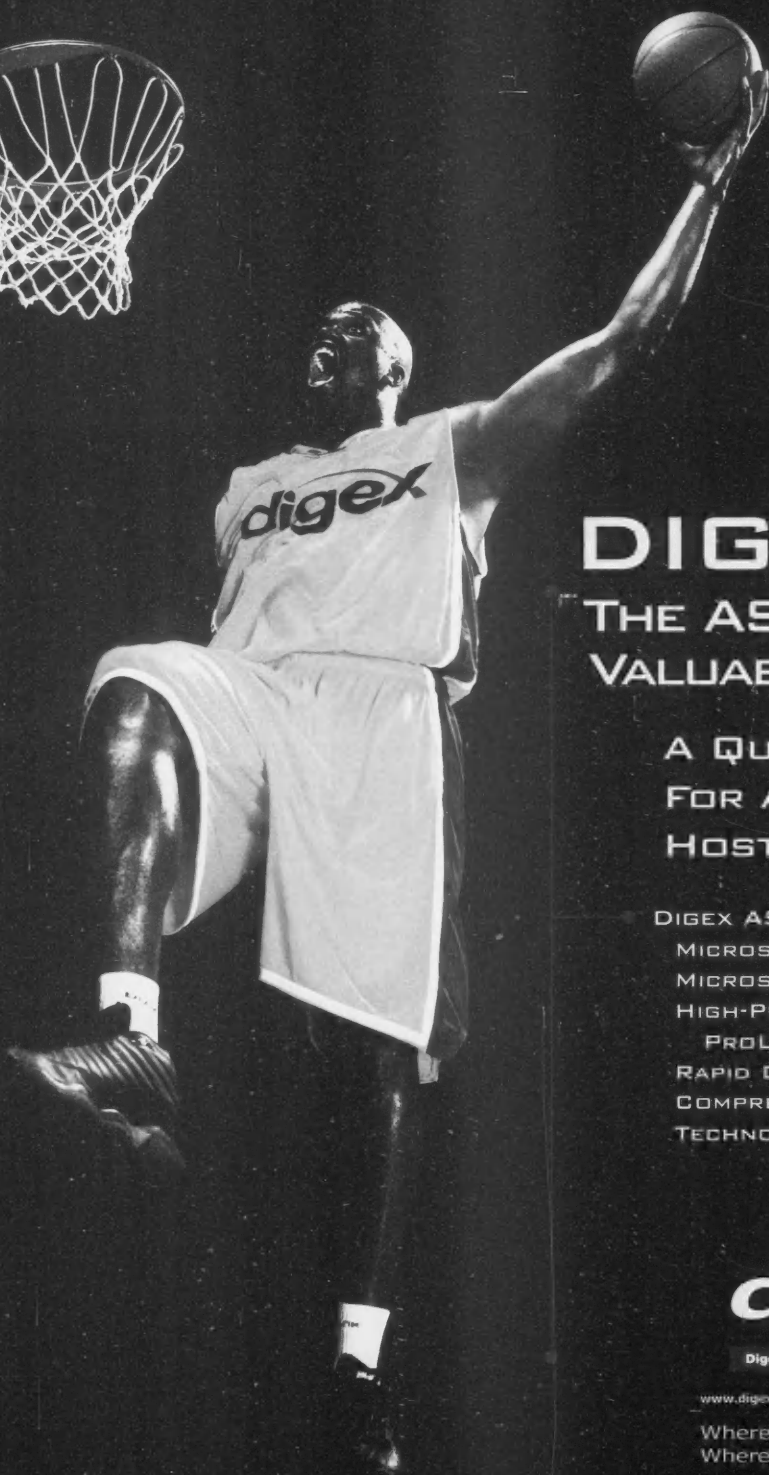
None of these ideas constitutes rocket science, but they're not easy to implement. Unfortunately, some users will never learn that it's worth the time and effort to create well-formulated requirements,

and the unpleasant consequence is that nearly all projects that get carried out for them will be frustrating failures. ■

If we don't understand [a requirement], how bad will it be?



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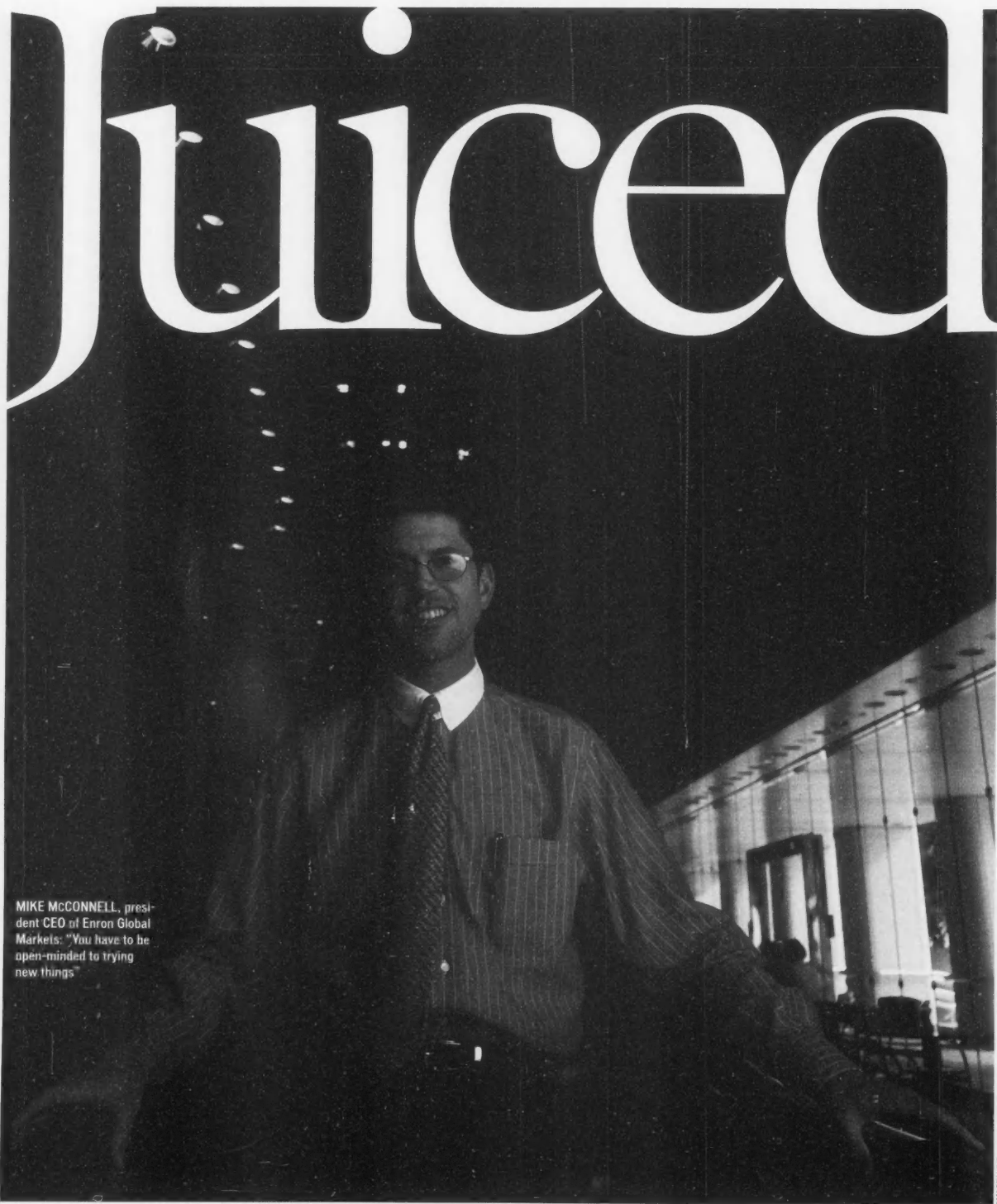
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Juiced



MIKE MCCONNELL, president CEO of Enron Global Markets: "You have to be open-minded to trying new things."

WALL STREET analysts and oil industry executives were thick among the legion of skeptics who thought Enron Corp. President and Chief Operating Officer Jeff Skilling was nuts to launch a Web site for the trading of natural gas and electricity over the Internet.

That was last November, before EnronOnline locked up more than \$120 billion in transactions in its first few months of operation, quickly establishing itself as the world's largest e-commerce company. As of Oct. 11, just prior to Enron's report of its third-quarter earnings, EnronOnline had executed more than 350,000 transactions, representing a gross value of \$183 billion.

Since then, the \$40 billion Houston-based energy giant has elbowed its way into several new diversified markets. And it plans to continue its push into many more, ranging from railcar cargo space to broadband networking and data-storage capacity.

In doing so, Enron is turbocharging its transformation from a stodgy, old-line fuel company to an entirely new kind of business-to-business market maker, with information technology and an all-out emphasis on entrepreneurship at the heart of its New Economy operations. Enron has been so successful in leveraging IT to pioneer new markets that others are trying to emulate its approach.

"We aspire to that kind of model," says Fred Buehler, director of electronic business at Eastman Chemical Co. in Kingsport, Tenn.

"In every sector, there will be one or two innovators who get out front and do things differently to create shareholder value," Buehler says. "We're trying to be one of them."

Market Maker

Stroll through the gas-trading section on the 32nd floor of Enron's glistening 50-story headquarters, and the company's technological sophistication is immediately evident. Traders like 26-year-old John Arnold, who personally executes about \$1 billion per day in trades, have real-time access to virtually any information that might affect their split-second buy-and-sell decisions.

That information might be a meteorologist's prediction of a colder-than-normal winter across the Plains states or a live news report of political insta-

bility in an oil-producing country in the Middle East.

Behind the scenes, all of Arnold's trades are instantly analyzed and processed by a sophisticated, proprietary risk-management system and then updated across multiple back-end computer systems worldwide. Less than a year after launching the operation, 60% of the world's gas is traded on EnronOnline.

"What we are doing, no one in the industry did 10 years ago. Eighty percent of our income this year is from businesses that didn't exist 10 years ago," says Skilling.

For example, EnronOnline contributed heavily to its parent company's third-quarter earnings, which were up 31% to \$292 million, compared with the same period last year.

"The change is technology-driven," Skilling adds. "We couldn't do what we do without massive amounts of computing capability." In this regard, Enron joins a short list of companies that

“

What we are doing, no one in the industry did 10 years ago.

JEFF SKILLING, PRESIDENT AND CHIEF OPERATING OFFICER, ENRON CORP.

includes Wal-Mart Stores Inc., FedEx Corp. and American Airlines Inc., which famously pioneered various mission-critical IT techniques to leapfrog competitors and create a whole new class of IT-enabled industry leaders.

Among Enron's boldest ideas is its use of a single, powerful software-based trading platform to insert itself as a principal buyer or seller in hundreds of different markets. Currently, Enron trades more than 1,000 different commodities, such as gold, natural gas and metals, on EnronOnline.

"The core of our business is our business model, which is a centralized risk-management and market-making business model. It just so happens that the Internet is just perfect for improv-

ing the efficiency of that model," Skilling says.

But as a market maker, EnronOnline stands alone. For starters, unlike most other Internet marketplaces, it's free. There are no transaction fees or catalog, inventory or subscription costs for users.

"Enron has broken away from the pack in the last year, in terms of their capital growth," says Ian Wylie, vice president of e-business at BP Amoco PLC in London. "And e-business is responsible for a lot of this change."

Even more unusual is Enron's role as a principal in each transaction. That means Enron is either the buyer or seller in every trade in which it's involved, unlike market makers that simply act as matchmakers between buyers and sellers.

In fact, Skilling, as well as Mike McConnell, who heads EnronOnline's global expansion efforts as president and CEO of Enron Global Markets LLC, dismisses much of the current hyperactivity surrounding other fee-based business-to-business exchanges as a flash in the pan.

"[Many of the] B2B guys think all you have to do is set up a bulletin board and people will start transacting, but it doesn't work that way," Skilling says. "You need to know you can deliver if push comes to shove."

As either the seller or buyer in all of its trades, Enron, an established brand name with 32,000 miles of pipeline and deep financial pockets, guarantees delivery or payment on all trades that are executed on EnronOnline.

"We're creating markets that were highly illiquid, so someone has to put their reputation on the line to say, 'We'll deliver,'" Skilling says.

But guaranteeing delivery also requires having guaranteed access to physical assets such as network bandwidth and papermaking plants. Guaranteed access also ensures marketplace liquidity. For Enron, this is where the bricks and mortar come in.

For example, to help drive its liquidity in the pulp and paper market, Enron paid \$72 million in July for Garden State Paper Co., a recycled-newsprint mill in Garfield, N.J.

Skilling's current market fancy is metals, and in May, Enron bought MG PLC, a London-based metals marketer. "You have to break the liquidity logjam, and to do that, you have to take a risk position," Skilling says.

But once the logjam is cleared, En-

By the Numbers

Enron Corp.

- Headquarters: Houston
- 1999 revenue: \$40 billion
- 1999 net income: \$893 million
- 1999 employees: 17,900
- Fortune 500 rank: 18

EnronOnline

- Transactions for 2000, as of mid-October: 352,000
- Value: \$183 billion

SOURCE: ENRON CORP., JEFFREY SKILLING

How Enron built a \$183 billion e-business in less than a year. By Julia King and Gary H. Anthes

ron is just as likely to sell off the brick-and-mortar assets it acquired and use the cash to invest in new business.

For example, to finance its new bandwidth-trading operation, Enron is selling Portland General Electric Co., a Portland, Ore.-based power producer that it bought in 1997, so it could bring liquidity to and guarantee trades in the online electricity market.

Eventually, Enron may end up trading commodities that aren't even considered commodities — at least not at the moment — such as data storage capacity or empty railcar space.

"Might we move into saucers or meats or grains? Potentially," says McConnell, who was Enron's de facto CIO before moving into his current role (see story below).

"You have to be creative every day," McConnell says. "You have to be open-

minded to trying new things."

But what remains constant throughout all the upsizing and downsizing is Enron's core IT-enabled business model, which is what puts it in a class of its own, analysts say.

"People have talked a lot about systems that they're about to roll out, but there is just not much out there for direct trading," says Mike Heim, an energy analyst at A.G. Edwards & Sons Inc. in St. Louis. "Enron rolled out its technology 10 months ago, and still there isn't much else out there. There hasn't been much competition [because] there isn't anybody in the same class."

But just last month, Houston-based Dynegy Inc. launched Dynegydirect, an Internet-based, commission-free trading site for energy and communications commodities.

Also last month, Intercontinental-

Exchange in Atlanta, whose partners include BP Amoco and The Hague-based Royal Dutch/Shell Group, added natural gas and power to its online trading system, which already included precious metals and crude oil.

Skilling doesn't get called "nuts" much anymore. In fact, he's a darling on Wall Street, where Enron's stock has soared from around \$40 per share last November to \$81 as of this Nov. 2. As a result, Enron — by all accounts, an Old Economy gas pipeline company until 12 months ago — is widely regarded as a New Economy pioneer.

Says Skilling, "We like to say we were B2B before there was B2B." ■

MOREONLINE

For more about Enron's push into broadband services, visit our Web site.
www.computerworld.com/more

Thriving On the Unconventional

As head of two Enron pipeline subsidiaries, Mike McConnell knew a lot more about gas flows than he did about data flows last year when he got a surprise call from Enron President and Chief Operating Officer Jeff Skilling.

Recalls McConnell, "Jeff went into this whole thought process about how the Internet is changing everything. He said, 'We need to make Enron an e-business, and I need a guy that can run this as a business. We need to change the way we view technology.'

"I thought he was a little crazy and I said, 'Jeff, I'm not a technology person at all,' He said, 'No, seriously — this is going to be big.' So I took over as CEO of Enron Global Technology," and thus became the company's de facto CIO, McConnell explains.

Appointing a person with no technology background to the top IT post is an unusual move. But Enron often defies convention and typically thrives as a result. Indeed, Enron boasts an entrepreneurial culture that's unusual in large, long-established companies, and in utilities firms in particular.

McConnell relates the tale of how 29-year-old Louise Kitchen, Enron's head gas trader in Europe, spearheaded the creation of an online gas-trading system, recruiting IT people from elsewhere in the company to do the development work. Word of the Web-based platform, EnronOnline, which is literally remaking the company, didn't reach top management until a few weeks before it went live.

Kitchen enlisted the support of Enron's initially skeptical top traders, and she scoured the company for software developers and other experts. Her small army of volunteers

worked nights and weekends on the project while carrying on with their regular jobs.

"It's an amazing story about not getting corporate approval and going through all the bureaucracy," McConnell says. "No one went to the board and said, 'We want to change the way we trade.' You just do it."

Glowing Endorsement

Soon after McConnell became the de facto CIO of the \$40 billion energy company, he joined eight of Sun Microsystems Inc.'s top Houston customers at a breakfast hosted by Sun CEO Scott McNealy.

"I was very nervous," recalls McConnell. "I mean, McNealy is the guy, and here I know nothing about technology. I'd been on the job maybe two weeks."

McNealy asked the attendees — all but McConnell were middle-aged CIOs with many years of IT experience — to introduce themselves in turn.

"When Scott came to me, I said, 'I'm the CEO of Global Technology, and we want to be the leader in B2B commerce in the world.' He kind of sat back and said, 'How long have you been in the IT business?'" McConnell explains. "About nine days," I said, "and we are going to take a little bit different approach to technology." Scott chuckled and said, "That sounds like Enron; it always looks at things differently." He then stated that my CEO title and Enron's approach were very unusual but that it would be more commonplace soon, as this was the way of the future."

McConnell says McNealy's endorsement had "a huge impact" on how he structured IT

at Enron during the following year.

"I realized that we weren't too late to change our approach and take a commercial view of technology," he says — a view of IT as an integral part of the business, not as something that supports business functions. "None of the other companies were thinking our new way at all."

Taking a commercial view of IT has led to a blurring of the line that traditionally separates IT organizations from the business units they support. When McConnell became CEO of Global Technology, Enron had five CIOs who were predominantly operating independently inside the company's major lines of business.

"Each CIO had his own agenda, his own thought process, his own goals, and they did not communicate at all," he says.

McConnell established corporate standards for IT, created a management team that included the five CIOs and put all IT people under a new chief technology officer, Philippe Bibi.

But IT is far from centralized at Enron. "We wanted to make people think about technology not as IT and support, but as an extension of your business," he explains. "So we seeded people out into the business units. [IT] directs the performance review process, but the business units have the greatest influence on where the person actually ranks and is rated."

Firms like Enron that merge IT departments with the business units they serve will be the winners among fast-paced e-businesses, says IT organization expert Robert Zawacki, president of Zawacki and Associates in Colorado Springs and a professor emeritus at the University of Colorado, also in Colorado Springs. "We need more entrepreneurial leaders in IT, and [McConnell] is certainly one," he says.

IT makes it easier to be entrepreneurial, says McConnell, who is now president and CEO of Enron Global Markets. "We really do like to try things and see what happens, and when you have an electronic platform like [EnronOnline] that we can model into different sectors, it's very inexpensive to try it. We are not afraid; if it's not working, we'll just stop."

— Gary H. Anthes and Julia King

EnronOnline: How It Works

Enron operates in hundreds of different commodity markets, using a Web-based trading platform called EnronOnline. The system, which is based on Enterprise JavaBeans technology from Sun Microsystems Inc. and Oracle Corp.'s database technology, was built entirely in-house and took about seven months to complete. In September, Enron launched Version 2.0 of the trading system, which, among other things, includes market and trading news, weather information and the ability to place limit orders.

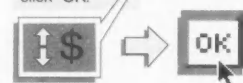
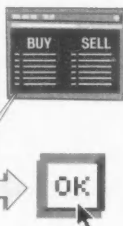
1 A user logs on to view a customized set of markets in which he wants to buy or sell.



2 Buy and sell prices are displayed side by side. The "spread,"

which is the margin between the bid and the offer prices, is visible on all deals and can change by the second.

3 To buy or sell, user clicks the price button. A screen pops up on which he can change the volume on an order or simply click "OK."



4 The deal's done. Settlement, transportation and other logistics are handled off-line.





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THINKING OF getting a master's degree in e-commerce? Get ready for a world that's as unsettled as e-business itself.

Master's programs range from the heavy business focus of MBAs to the hands-on approach of master of science programs. But they all have several things in common: They've been cobbled together in record time, they're evolving by the minute, they're wildly popular with students, and they will probably disappear in five years.

Here's a look at a handful of programs that illustrate some of the approaches to this new field of study.

A DAY AT MIT

In an amphitheater-style class called "Proseminar in Electronic Commerce and Marketing," approximately 80 students at MIT's Sloan School of Management listen as Gabriel R. Bitran, a deputy dean, leads the discussion.

"We are all learning, so I wouldn't introduce myself as an expert," Bitran tells the class. "More as a person who is curious and trying to learn more."

That perspective also characterizes most e-commerce master's programs, as academic institutions all over the country take a seat-of-the-pants approach to teaching the moving target of e-business at the postgraduate level.

Bitran is discussing how the Internet improves a company's customer relationships by allowing a customer to "see into the company." To illustrate the point, he cites Benihana, the Japanese-style steak-house chain that "moved the kitchen to the customer's table" to create a new and profitable restaurant model.

"The Internet can do the same," Bitran says. "The question is how."

Before this Wednesday evening class, students attended a weekly reception to mingle with representatives of the Boston business community. Companies sending representatives included FleetBoston Financial Corp. and Zefer Corp., which were there to propose e-commerce projects and build relationships with students.

These relationships are a key to the success of the Sloan program, an MBA program with an e-commerce concentration that's strongly geared toward entrepreneurial students.

"The resources the e-business track puts together to help people are tremendous," explains Hala Fadel, a second-year MBA student in the 3-year-old e-commerce track. "A lot of networking activities take place among students and businesspeople and faculty, giving us opportunities to bounce around ideas with people who have great ideas of their own and the experience to give us feedback."

Earlier that day, about 85 students

occupied every seat in the oversubscribed "Introduction to E-Commerce" class. There, they discussed the business model of Woburn, Mass.-based online auction service FairMarket Inc. with Prof. Jim Short.

Approximately one quarter of the class are female. Approximately one-third are from countries other than the U.S. About one quarter are from companies that include General Motors Corp., Korean Air Lines Co., BASF Corp. and Sony Corp. Most students are in their late 20s, and many have e-commerce experience.

Because e-commerce is a track rather than a separate program, MIT won't know for sure which students will graduate with an e-commerce concentration until they finish the program and count up the credits.

Despite MIT's reputation as a top technology university, the Sloan School's approach to e-commerce is all business.

"You don't need to know the details of the technology. How the technology

interacts with the business model and the environment is what's important," says Melinda Rothstein, a second-year student in the e-commerce track.

NOT FOR TECHIES

The MBA-with-a-specialization approach is typical of many schools, including Loyola University in Chicago, where the expectation is that eventually e-commerce studies will be absorbed into business classes, says John Nicholas, associate dean of the Graduate School of Business.

But meanwhile, the year-old e-commerce specialization has caught fire. "We're now offering our core courses four times a year because they fill up immediately," he says. "Every time we introduce a new course, it fills up."

Nicholas estimates that one-fourth to one-third of the 800 students in the MBA program are specializing in e-commerce. "It's probably the most popular specialization we have," he says.

Nicholas has determined that the

average Loyola graduate student has five years of work experience and attends the program part time. But he cautions that the MBA approach is directed toward business students, not techies. "Business courses are aimed at a different audience [than computer science courses]," he says. "So if you take a telecom course, it's taught by a business professor with a business perspective."

This kind of focus would help a technical person see the big picture in terms of e-commerce applications and their implications for business, Nicholas says.

That's a different approach from the one taken by the new Master of Science in E-Commerce (MSEC) program at the School of Business Administration of the University of San Diego (USD). Program coordinator Gary Schneider says that, unlike a more general MBA program, the MSEC is meant for students who really want hands-on e-commerce learning.

"We don't have marketing; we have

A host of new postgraduate programs in e-commerce are taking off on college campuses, with most of them run as seat-of-the-pants as the dot-coms they study.

By Kathleen Melymuka

MASTERING E-COMMERCE BY DEGREES

Internet marketing," Schneider says. "We don't have business ethics; it's ethics and the law for online organizations. We're focused."

That approach appeals to the 11 students — out of 30 applicants — accepted into the first MSEC program at USD. All of them have at least two years of work experience. Two already have MBAs. They are engineers and people in the wireless industry or in e-commerce at traditional companies.

Schneider says some plan to go into business for themselves; others are from mainstream firms that are just trying to get a handle on e-commerce.

Kathy Glaser represents the latter group. She currently works in contract management for a major defense contractor in California. She has a business degree and five years of work experience, much of it in building Web-based tools for managing contracts.

Glaser had been accepted into an MBA program when she heard about the MSEC program at USD. She says she wondered at first whether an

e-commerce degree was too focused.

"I decided it is focused, but doing business on the Web is going to be the big thing for next five to 15 years," Glaser says. "It's very relevant to what I want to be doing today."

IN BETWEEN

North Carolina State University in Raleigh strikes an interesting middle ground between business and technology, with an e-commerce concentration offered in its master's program in management.

As part of the flagship science and engineering campus of the University of North Carolina system, the College of Management at North Carolina State is much more technology-focused than most other business programs.

At North Carolina State, "management" means "technology management," says Michael Rappa, professor of technology management and program co-director. The result is an e-commerce concentration more tech-

nically oriented than most business schools yet more business-oriented than other master of science programs.

Across the country, San Francisco State University also takes a hybrid approach with its Master of Science in Business Administration (MSBA) with a concentration in e-commerce.

Research has shown that local Silicon Valley businesses are looking for a particular profile in master's-level graduates in e-commerce, says Rob Nickerson, director of the Center for Electronic Commerce in the College of Business. They want people who can bridge the gap between the technology specialists and businesspeople and manage the development of e-commerce sites and projects.

"We realized we needed to have more courses available to the student than the MBA allowed us to do," Nickerson says. The new MSBA program requires the same eight business courses as the MBA in the first year, but the second year is nearly all e-commerce. ■

E-COMMERCE ENTREPRENEURS

HALA FADEL, SUNANDA NARAYANAN AND MELINDA ROTHSTEIN are students in the e-commerce track of the MBA program at the Sloan School of Management at MIT. They're also on the fast track to success as entrepreneurs in e-business.

Like many MBA students, the three women already have impressive résumés.

Fadel, 26, born in France, has a master's degree in finance and has worked in investment banking.

Narayanan, 28, earned a master's in computer science and computer applications in her native India. She worked as a software consultant before moving to the U.S., where she has consulted on customer relationship management with telecommunications providers.

Rothstein, 26, has a bachelor of arts in economics and French and has done economic research for the Federal Reserve Bank, as well as sales and marketing for a software company.

"We all came to the Sloan program because we wanted to do something different, something entrepreneurial," Fadel says.

In their first year at MIT, the women founded their own e-business, called Booleo, which means "to decide" in ancient Greek. It will offer Web-based software to help business telecommunications managers make the best decisions about choosing vendors and services.

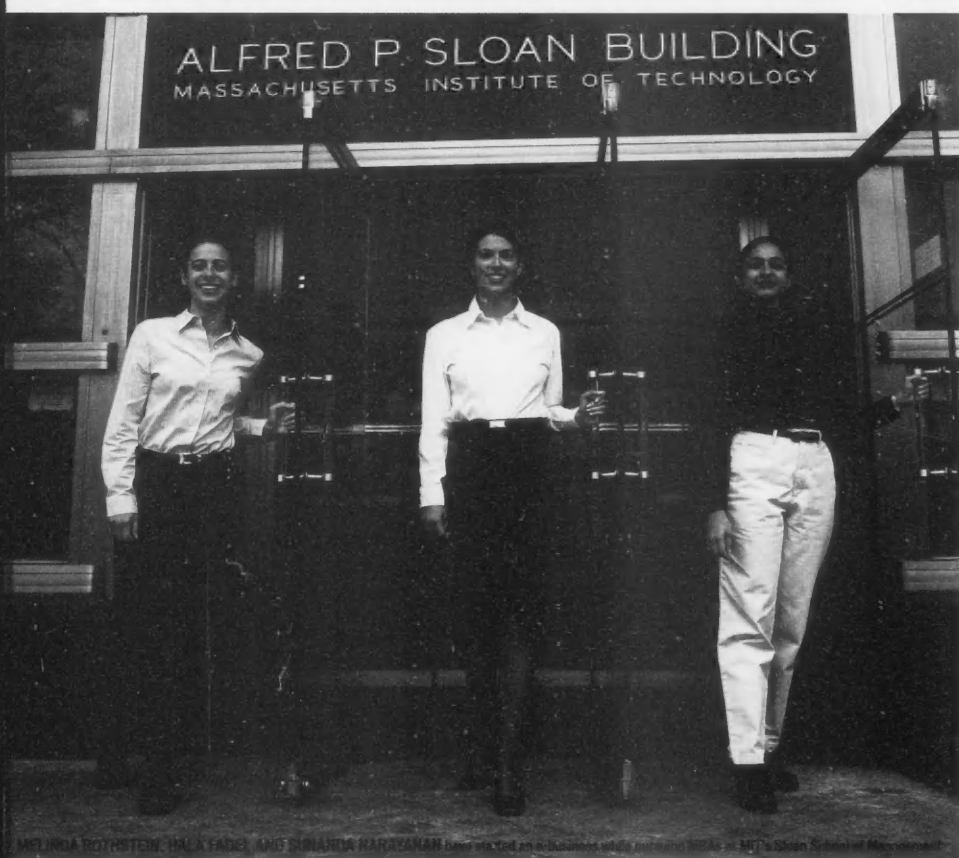
"We're still in the early stages," Narayanan says. "We've raised seed money and have built a prototype to demonstrate how the system will work. Once we get some client buy-in, we hope to take it to venture capitalists to fund."

Their student project this year is to enhance the user interface of their prototype, and they've found the Sloan School to be highly supportive of their entrepreneurial goals. "The e-business track is all about flexibility to encourage e-business and entrepreneurship," Narayanan says.

"We can organize the year to allow us to work almost full time on the company that we are creating," Fadel adds.

They agree that what goes on outside the classroom at Sloan is at least as important as what happens inside. They say interactions with students, faculty and businesspeople enrich their understanding and help push their business forward. For example, half their new company's advisory board, which includes executives at Motorola Inc., American Express Co. and European bank Rabobank, was generated through Sloan School contacts.

— Kathleen Molyneux



MELINDA ROTHSTEIN, HALA FADEL, AND SUNANDA NARAYANAN have started an e-business while pursuing MBAs at MIT's Sloan School of Management.

Just-in-Time Manufacturing

BY MARC L. SONGINI

UNTIL A CRYSTAL ball comes along that lets companies forecast exactly what their customers will want so they can make it in advance, large corporations will continue to turn to just-in-time manufacturing.

This process lets manufacturers purchase and receive components just before they're needed on the assembly line. As a consequence, it relieves manufacturers of the cost and burden of housing and managing idle parts.

Although companies such as SAP AG offer enterprise resource planning software to coordinate supply chains so they can handle just-in-time processes, analysts say there's still a lot of room for improvement by using the Web.

Most observers point to automotive firms such as Torrance, Calif.-based Toyota Motor Sales USA Inc. as the earliest and highest-profile adopters of just-in-time processes. High-tech companies such as Round Rock, Texas-based Dell Computer Corp. and San Jose-based Cisco Systems Inc. have followed suit.

"The Toyota production system is famous for efficiency and coordination, but it has been a highly manual system with very low-level technology," says Tom Jones, a senior vice president at Miami-based Ryder System Inc., which outsources just-in-time supply-chain services.

But Toyota has been working to make its supply chain more flexible by moving it onto the Web, and other car companies such as Dearborn, Mich.-based Ford Motor Co. have been following in Toyota's treads, says Jones.

The Web allows the automakers to send requests for parts to their suppliers as the need arises, regardless of

DEFINITION

Just-in-time manufacturing is a process where inventory is delivered to the factory by suppliers only when it's needed for assembly. Companies are beginning to turn to Internet-based technologies to communicate with their suppliers, making the just-in-time ordering and delivery process speedier and more flexible.

whether disparate computer platforms are involved. For instance, if a car company experiences a high demand for a certain color vehicle, it can notify its paint supplier and get the product delivered to its factory quickly and with a minimum amount of human intervention or paperwork.

Build to Order

In the high-tech area, companies are turning to a build-to-order process in which a product is customized and manufactured according to specific customer requests, making just-in-time manufacturing and delivery key, says Michael Burkett, a senior research analyst at AMR Research Inc. in Boston.

At Dell, the process is called "pull to order," says company spokesman Venancio Figueroa. "It's a critical element of our build-to-order manufacturing process," he says. The model contributes to "increasing the accuracy of doing business, both from a customer and supplier standpoint."

Once the parts are delivered, the assembly-line process can begin prepping components. Dell then begins manufacturing the actual computer. After-

ward, it tests and does custom integration work for the finished product.

The build-to-order process is only one part of Dell's approach to efficiency — to further improve the manufacturing processes, the company also relies on special hydraulic tools, conveyor belts and tracks, reducing the need for human intervention by half. This means better overall quality, says Figueroa.

Dell is able to achieve a four-hour production cycle time using an Internet-based supply-chain management system, Figueroa says. After getting an order, Dell notifies its suppliers about what components are needed, and they're delivered within an hour and a half.

"With our pull-to-order system, we've been able to eliminate warehouses in our factories and have improved factory output by double by adding production lines where warehouses used to be," says Figueroa.

Dell plans to save \$15 million in the first six months with its build-to-order process; within three years, that figure should be \$150 million, says Figueroa.

Dell generally fulfills customer demands within five

days, and the firm plans to reduce that time by relying on more extensive Web-based collaborative technologies, he says.

In addition to the manufacturing efficiencies, there are other reasons why build-to-order is appealing. For instance, it helps prevent manufacturers from being stuck with inventory that may become obsolete as it sits gathering dust in a warehouse, says Burkett. Or if there's a design change to a manufactured product, a company can be stuck with useless inventory that it has to dispose of at a loss.

Pros and Cons

There's a flip side, however. The just-in-time method demands a very disciplined assembly-line process, says David Dobrin, an analyst at Surgency Inc. in Cambridge, Mass. The entire factory has to be in sync to successfully exploit its methods. Manufacturers can afford

fewer errors in the delivery of the supplier's component; if a part isn't there, the assembly line stops, and that can result in the loss of manpower and cash.

Moreover, just-in-time manufacturing doesn't necessarily mean a company is saving money on its supply chain — often, companies just have a distributor or supplier maintain a warehouse, either on-site or nearby, says Dobrin.

This is an area where the Internet could improve existing processes, say analysts. Like Dell, other companies are trying to establish faster, more efficient communications with their suppliers by using the Web, says Dobrin, and the older form of communication — electronic data interchange — is being phased out.

The Web permits very intimate contact between supplier and manufacturer. For instance, Cisco shares its manufacturing schedules with suppliers so they'll know how much inventory they need to have on hand.

There can be obstacles to getting these Web processes for just-in-time manufacturing up and running. Cincinnati-based Procter & Gamble Co., for instance, is struggling with variations in data-formatting methods among its suppliers, according to CIO Steve David. Human intervention is required to do the data translation, which slows the process.

In the near term, Procter & Gamble plans to get 50% of its orders to the Web next year, taking two days off the order cycle time.

For the long run, David says, he hopes to have a just-in-time-based supply chain that's accessible to everyone, from the retailer to Procter & Gamble's suppliers to the suppliers' suppliers. However, for that to happen, "we need to have data visibility across all of the supply-chain partners," he says. ▀

“
We need to have data visibility across all of the supply-chain partners.

STEVE DAVID, CIO,
 PROCTER & GAMBLE



Dear Career Adviser:

I'm the director of network operations at a large university and took a significant pay cut to gain experience managing a large network with a staff of 50. Now, I understand this move could have jeopardized my career if I wish to return to the private sector. How do I build a

résumé that allows me to compete for CIO positions at midsize companies?

— MS. UNIVERSITY

Dear University:

From a technology perspective, your university's networking environment has outpaced most midsize companies you would be working for, says Rizwan Akhtar, vice president of IT at Cosaweb Inc., a midsize application service provider in Downers Grove, Ill.

But to become a director or CIO at a commercial enterprise, your current résumé needs to have a greater business emphasis. Both director and CIO positions at companies require you to create and execute project plans and manage budgets of more than \$2 million. Your résumé

needs to emphasize business and finance skills.

Follow Akhtar's advice and state your experience in terms of responsiveness to business goals, where you can show how you simplified operating complexity and implemented cost-effective operational plans.

Dear Career Adviser:

I'm a financial applications consultant who is being courted by a pre-initial public offering online finance company with a terrific market idea. It is building a product and consulting organization and seeking its second round of funding. Is this opportunity real?

— BASIC INFORMATION

Dear Basic:

Getting that second round

of funding and holding on to a market can be real minefields right now, cautions Ann Winblad, a partner at San Francisco-based Hummer Winblad Venture Partners. Among her recent and more painful funding experiences are Pets.com Inc. and Napster Inc.

"Venture backers have returned to 1995, pre-Netscape thinking," Winblad emphasizes.

Therefore, software companies that get second-round funding must demonstrate that they can create sustainable businesses for two to four years before going public while upholding familiar software-business standards: gross

margins of 80% and pretax margins of 20% to 25%.

The company must also show that it isn't based on a theme that can easily go dead along with its entire niche market. It must have a solid core asset — such as its intellectual capital or team — and be able to create a solid but not overengineered product and to build revenue and partnership deals.

In your interviews, ferret out real information about revenue, expenses and business models. "It's not about the end of the world," says Winblad. "It's about the search for gasoline."

Dear Career Adviser:

I'm following up on the question from "Ears" regarding help desk personnel. I'm now going from three years of internal help desk support experience to work for a vendor. What questions do I need to ask?

— SWEATSHOP-PHOBIC



FRAN QUITELL is an expert in high-tech careers and recruitment. Send questions to her at www.computerworld.com/career_adviser.

Dear Phobic:

Take a look at whether the vendor provides sup-

port directly or outsources it elsewhere. That's what Microsoft and many other companies with large market share and legions of customers seem to do.

Then ask plenty of questions regarding metrics. According to Richard Farrell, co-author of *The Art of Software Support* (Prentice Hall, 1997), metrics refer to four elements: case backlog, response times, resolution times and customer satisfaction.

Backlog metrics are very meaningful: A low of 10 per person is great, and an average of 25 is OK. But 40 cases backlogged per person means "go elsewhere." That's too much work per individual.

Also ask about how you're ranked on customer-feedback evaluations. Such surveys might base 25% of your rating on the quality of the call and 25% on the quality of the resolution, with the remaining 50% divided among response time (a team goal), resolution time (an individual goal) and the number of cases closed, which tends to be 10% to 15% of the evaluation, says Farrell.

If the vendor uses the HMO approach to customer support by focusing solely on the number of cases pushed through the system, keep looking. ▀

CONFERENCES

■ BUSINESS OF E-BUSINESS CONFERENCE

Caesar's Palace, Las Vegas; Dec. 4-6
Focuses on the e-business needs of auditing, accounting and financial professionals.
COST: \$1,095
CONTACT: MIS Training Institute, Framingham, Mass., (508) 879-7999; fax: (508) 872-1153
www.misti.com

■ EHEALTHCARE WORLD

Javits Center, New York; Dec. 4-6
Covers what the future holds for the convergence of health care and the Internet.
COST: \$1,295 by Dec. 1; \$1,395 after Dec. 1
CONTACT: eMarketworld Inc., Richmond, Va., (800) 535-1812 or (804) 643-8375; fax: (800) 942-9770 or (804) 643-7479

www.ehealthcareworld.com/events

■ ONLINE EXCHANGES 2000

Sheraton Hotel & Towers, Chicago; Dec. 4-6
A look at the present and future of business-to-business.
COST: \$1,795
CONTACT: First Conferences Ltd., London, (800) 814-3459; fax: (800) 814-3460
www.marketsandexchanges.com

■ CAPITOL SANS 2000

Grand Hyatt Washington; Dec. 10-15
The technology behind security — from soup to nuts.
COST: \$1,850 to \$2,999
CONTACT: The SANS Institute, Fredericksburg, Va., (540) 372-7066; fax: (540) 372-3835
www.sans.org/capsans2000
register

■ E-CUSTOMER SERVICE & SUPPORT

Hyatt Regency Hotel, Miami; Dec. 12-14
Learn about trends in e-commerce customer service, different means used to communicate with customers and how to identify the skills that are needed for good customer service and support.
COST: \$1,095 to \$1,295
CONTACT: Digital Consulting Inc., Andover, Mass., (978) 470-3880; fax: (978) 470-0526; e-mail: confreg@dcic.com
www.dci.com

■ E-BUSINESS CONFERENCE AND EXPO

Javits Center, New York; Dec. 12-14
Discusses strategies, products and implications of e-business.
COST: \$995 by Nov. 20; \$1,295 after Nov. 20
CONTACT: CMP Media Inc., Manhasset, N.Y., (800) 652-2578, Ext. 8228; fax: (212) 592-8233
www.ebusinessexpo.com

■ LOTUSPHERE 2001

Walt Disney World Resort, Orlando; Jan. 14-18
The latest in collaborative communication from a leading vendor of messaging products.
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CONTACT: Lotus Development Corp., Cambridge, Mass., (800) 655-6887 or (716) 264-4337; fax: (800) 859-8369
www.lotus.com/lotusphere

■ 2001 CORPORATE IMAGE CONFERENCE

Grand Hyatt Hotel, New York; Jan. 17-18
Focuses on corporate image strategies and tactics.
COST: \$1,495 for Conference Board associates; \$1,700 for others
CONTACT: The Conference Board Inc., New York, (212) 759-0900; fax: (212) 980-7014
www.conference-board.org

■ INVESTING IN HEALTH CARE IS & E-HEALTH

San Diego Marriott Hotel & Marina; Jan. 18-19
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CONTACT: Global Business Research Ltd., Nevada City, Calif., (530) 478-1523; fax: (530) 478-1773
www.globalbusinessresearch.com

■ CALL CENTER & CRM SOLUTIONS CONFERENCE

Wyndham Anatole Hotel, Dallas; Jan. 22-25
An understanding of customer relationship management technologies and management techniques that will be required for managers in the future.
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CONTACT: Call Center & CRM Solutions Dallas, (218) 723-9130; fax: (218) 723-9122
www.callvoice.com/cc2001

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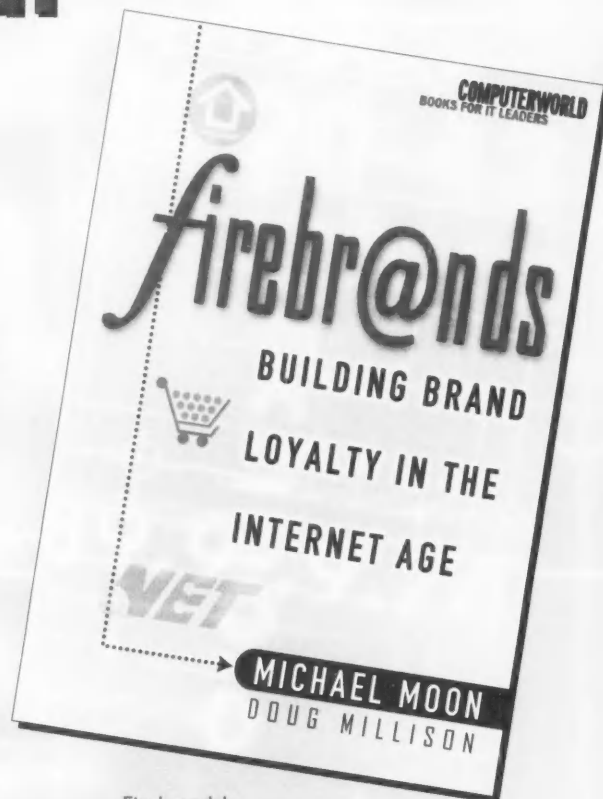
—Guy Kawasaki, CEO, *Garage.com*, Palo Alto, CA

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—Al Ries, *Ries & Ries Focusing Consultants*, Roswell, GA

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—Andy Brownell, Director of Marketing, *Compaq Computer Corporation*



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TECHNOLOGY

COMDEX REPORT

There seemed to be two dominant trends at Comdex this year — first, wireless everything everywhere, and second, Internet appliances. Reviews editor Russell Kay takes a tour of the wonderful, the wacky and the weird on exhibit at the show. **58**

SAN DECISIONS

Vendor prices for storage-area networks (SAN) vary wildly, from less than \$100,000 to well into the millions. But why buy more capability than you need? Three SAN users describe their storage needs and how they decided on the right vendor. You may not be able to buy a SAN on a shoestring budget, but you can make cost-effective choices. **62**

PEERLESS TECHNOLOGY?

Peer-to-peer technology — the ability to work and share files directly between computers — isn't new, and the applications built upon it still require going through at least a router to get at information on another machine. So what's the big deal? **54**

FUTURE WATCH

Everybody's got to be somewhere. And the emerging Geography Markup Language (GML) provides a standard, text-based way to describe that somewhere. GML isn't about maps; it's about data and being able to use all kinds of geographic information at once. **59**

QUICKSTUDY

Fault-tolerant computing describes an environment that provides continuous, uninterrupted service — access to data and application programs — even when a hardware, software or network component fails. Learn more in this week's primer. **66**

SECURITY JOURNAL

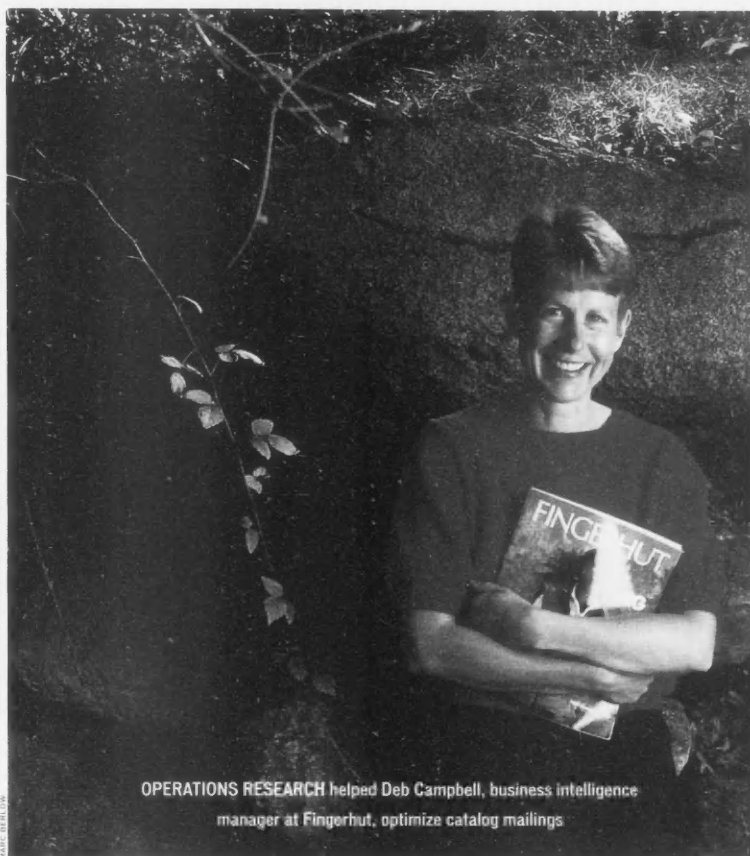
Our security manager wonders if he's spending more time in meetings selling management on security measures than he is implementing them — until the approvals roll in. Meanwhile, he faces the question of how to increase user comfort levels with encryption software. **56**

EMERGING COMPANIES

Alacritech's hot new network adapter gives servers a network performance boost by off-loading TCP/IP processing overhead. The results can be dramatic, and Alacritech's competitors are playing catch-up. But the product works only with Windows NT 4.0 servers — for now. **68**

EMERGING MARKETS

IT pros considering a move to the Chesapeake Bay region will find that the job opportunities, skill needs and even corporate cultures can vary tremendously among the states of Virginia, Maryland and Delaware. **70**



OPERATIONS RESEARCH helped Deb Campbell, business intelligence manager at Fingerhut, optimize catalog mailings

OUT OF THE IVORY TOWER

OPERATIONS RESEARCH (OR), which had its beginnings in the 1930s as a way for mathematicians to study military strategy, is moving out of the ivory tower and into corporate operations centers. Enabled by modern technology, IT managers can use OR to have a big impact on their companies' bottom line — once they realize what its capabilities are.

60

BRIEFS

SGI to Sell Servers To U.S. Air Force

Silicon Graphics Inc. has announced it will sell to the U.S. Air Force 18 of its Origin 3000 servers and 27 of its Onyx 3000 workstations for the Space-Based Infrared System (SBIRS), the Air Force's ballistic-missile warning system. The servers will be the front end for SBIRS satellites, and the Onyx machines will graphically display the data for U.S. military operators, said a spokesman at Mountain View, Calif.-based SGI.

GM Taps Etak for Real-Time Traffic News

Detroit-based General Motors Corp.'s OnStar division announced a deal with Etak Inc. last week. Etak, a Menlo Park, Calif.-based maker of mobile information systems and digital maps, will provide real-time traffic information to OnStar's in-vehicle communications service. Troy, Mich.-based OnStar subscribers will have access to location-based traffic updates, accident and road condition reports by spring.

Linux Code Released For Panther Software

Enterprise software maker JYACC Inc. in New York has released the source code for its Panther Open Source Software for Linux (POSSL) technology, which is widely known as a development environment for IBM's WebSphere Application Server. JYACC also announced the creation of an open-source online community for developers to collaborate on the continued evolution of the software. The community for POSSL is at www.possl.org.

Load-Testing Service

Redwood City, Calif.-based iSharp Inc.'s Performance Testing Services went live this month. A \$60,000 annual subscription from the managed service provider includes full custom Java-scripting services to build e-commerce application workloads to measure users' experiences and identify bottlenecks in Web and server operations. The load-testing service is also available on a project basis beginning at \$20,000.

What's So New About Peer-to-Peer?

The next great thing on the Internet has been around for a while, some say

BY JENNIFER DISABATINO

PEER-TO-PEER technology, the ability to work with and share files directly from computer to computer, is the latest buzz in the computer industry. The technology isn't new, however, and the applications built upon it may still need to go through at least a router to get at information on another machine.

So, what's the big deal?

"The potential for peer-to-peer — it's really the potential of the Internet," said Esther Dyson, chairwoman of EDven-

ture Holdings Inc. in New York.

Microsoft Corp. Chairman Bill Gates and Intel Corp. Chairman Andrew Grove have both said they believe peer-to-peer is going to be very important.

No Centralized Control

In theory, peer-to-peer computing means working without a central, controlling authority: the server. And that raises a lot of interesting social implications. "It means individual initiative, not something centrally controlled," said Dyson last month.

Securant Boosts Its Web Access Management Suite

ClearTrust offers increased support

BY JAIKUMAR VIJAYAN

Companies looking to implement Web access management technologies should find a slew of increasingly sophisticated options to choose from, according to analysts.

Two weeks ago, for instance, Securant Technologies Inc., a San Francisco-based vendor of Web access management software, released a new version of its technology, featuring native support for Windows 2000 environments and better remote management capabilities, according to the company.

Securant's ClearTrust SecureControl 4.5 allows corporations to centrally set security policies to control user access to Web applications hosted on Windows 2000 operating environments and Java-based application servers, said Eric Olden, chief technology officer at Securant.

The technology will allow

security administrators to use Active Directory's user information for enforcing security policies across a range of operating systems and Web applications, he added.

Browser-Based Administration

The latest version of the software also features a new interface that lets administrators perform Web-based delegated user administration tasks — such as setting up log-ons and passwords — via a browser, Olden said.

Securant's ClearTrust software is an example of the increasingly sophisticated Web-based access and delegated ad-

The technology isn't yet a reality, however, because there are no standards for peer-to-peer protocols. Proponents met in September to begin talking about standards and the public's perception of peer-to-peer computing.

San Mateo, Calif.-based Napster Inc.'s application of peer-to-peer technology — the most famous, or infamous — caught the popular imagination by subverting the music industry and allowing users to scan the hard drives of other online users for music files they could download for free.

Other applications, like the SETI@home project and Groove Networks from Groove Networks Inc. in Beverly, Mass., also use peer-to-peer technology.

The Search for Extra-Terrestrial Intelligence (SETI) uses normally unused disk space on PCs to help the Mountain View, Calif.-based SETI Institute search for intelligent life elsewhere in the universe. Groove promises to link all kinds of content with a real-time collaborative tool. The difference between his system and Napster's, according to Groove creator Ray Ozzie, is that users will be able to access any type of application, not just music files.

These applications may be

new, but the underlying technology isn't, said analysts. "It's sort of back to the future," said Dana Gardner, an analyst at Aberdeen Group Inc. in Boston, referring to much of the original use of networked computers and even the Internet.

"I'm amazed that people are talking about peer-to-peer being this whole new thing," said Gordon Eubanks, president and CEO of Cupertino, Calif.-based software vendor Oblix Inc. "Peer-to-peer is not, in my mind, fundamentally different than what we've been doing with the Internet all along."

No Faster Than Web Servers

Robert Mahowald, an analyst at International Data Corp. in Framingham, Mass., said he doubts that applications like Groove are all that different from the client/server-based model.

"Basically, [Groove] is peer-to-server-to-peer," Mahowald said. "There is a server built in there somewhere."

A Groove spokesman had acknowledged that information must go through a router, and may even stay there while the intended recipient is offline.

What's the difference between Groove's peer-to-peer application and a Web server that points a user to another address, Mahowald asked. "There's no great reason not to do it [a client/server] way," he said. "In a demonstration we saw, [Groove] wasn't any faster than anything we've ever seen."

administration capabilities available to users, said Phil Schacter, an analyst at The Burton Group, a Midvale, Utah-based consultancy.

Other vendors competing in this space include IBM; Netegrity Inc. in Waltham, Mass.; Entrust Technologies Inc. in Plano, Texas; and Oblix Inc. in Cupertino, Calif.

Crucial Capabilities

Increasingly, such software is letting companies use business rules and user profiles to create, centralize and automate all aspects of access management, including user authentication, single sign-on and delegated administration for controlling access to Web-

based applications and content, said Roberta Witty, an analyst at Gartner Group Inc. in Stamford, Conn.

Such capabilities are becoming more crucial as companies move toward e-business and business-to-business e-commerce, analysts said.

With traditional user-access management, administrators have typically dealt with a finite number of users and managing access mainly to internal applications and resources.

"With Web applications, you are talking about literally millions of customers' seeking access to content and applications," said Witty. "There's no way companies can manage it themselves."

Gatekeepers

A sampling of access management software:

Vendor	Product
Netegrity	SiteMinder
IBM	SecureWay
Entrust	GetAccess
Oblix	Netpoint



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Security Management Turns Into a Sales Job

Long meetings frustrate but eventually pay off

I REMEMBER how bored I got when I first started work as a graduate trainee. I worked for a big consulting firm as a security specialist, and I was too junior to send out on jobs on my own and too much of a specialist to be much help on other projects. So I spent a lot of time loafing around the office.

I really can't imagine going through that here. As an example, and despite the fact that I will do almost anything to avoid going to any meeting with more than three people in it, my day yesterday was back-to-back meetings, apart from a half-hour for lunch. My days seem to be taken up more and more with talking to people, convincing them of the need for security, and less and less with actually keeping an eye on the security of our systems.

By concentrating on the "soft" side of the job — talking, meeting and greeting — the technical side of my job has suffered to the extent that I now find myself trying to squeeze product evaluations into 20-minute slots between meetings.

Help Wanted

However, my efforts paid off when management recognized the need to get some real resources behind the job. I've been given the authority to hire four new security engineers to take on all the technical security work. That's a blessing, because I've never been that technical myself, so I'll finally be able to get systems implemented and configured much more easily.

But it's turning out to be difficult to find the right people. Each of the security engineers is going to concentrate on one particular area — one for Windows NT, one for Unix, one for e-commerce, one for networks — and so each needs to be a specialist in that area. Above that, each engineer also needs to know a fair amount about security. As any engineering manager will tell you, it's hard enough just to find and afford a

technically competent Windows engineer without demanding additional specialties such as security expertise.

Still, I'll keep looking. I have a feeling that it's going to take a few months to find the right people. In the meantime, there are two internal candidates who are both knowledgeable and professional — what more do you

need? Neither has any current security qualifications, but it's much easier to train good staff than it is to find trained staff who are good.

One of the larger calls on my time this week has been something rather thought-provoking. I was asked by a group of venture capitalists to give them an overview of the security industry. The idea was to give them an insider's view of the industry, to help them tell the next big thing from the next big flop and to help them understand some of the underlying technology.

Writing the presentation has given me a whole new perspective on my industry. It's forced me to think about the economic forces shaping the industry, rather than the functionality available to me from vendors.

It's also thrown up a lot of questions that I'm not sure I can answer. For example, what will be the effect on public-key infrastructure vendors like VeriSign Inc., Entrust Technologies Inc. and Baltimore Technologies PLC now that Microsoft Corp. is giving away its certificate authority software with Windows 2000? How long can the current cutthroat business practices in the antivirus world last? Will biometrics ever really take off? But one thing didn't surprise me: One mention of cryptography and their faces started to glaze over. Although crypto is fundamental to many emerging e-commerce technologies — such as digital watermarks, digital currencies and secure electronic voting protocols — for some reason, it's exceptionally hard to explain.

This is partly because there are no easy analogies to use to explain the

concepts. When I want to explain firewalls, I can compare them to a bouncer at the door of a nightclub. Content scanning? Think wartime censors. Intrusion-detection software? The information technology version of burglar alarms. But crypto? Crypto algorithms are based on abstract mathematical principles, and to really understand the implications of crypto technologies, you've got to have a basic understanding of how they work. However, as soon as people realize that they're dealing with mathematical processes, a lot of people just switch off.

This is why I had difficulties with PGP encryption software a couple of months ago — not because there's anything wrong with the software, but because users just don't understand the basic concepts of how it works. My problem back then was that an otherwise highly intelligent end user couldn't grasp the concept that if you encrypted a message for one person, then only that person could read it. He tried forwarding encrypted e-mail, expecting other people to be able to read the e-mail that had been encrypted for his eyes only.

Keep it Simple

However, after that episode, I had an e-mail conversation with a nontechnical reader who suggested that I use WinZip Computing Inc.'s password protection as an alternative. Now password protection isn't anywhere near as strong as good crypto, but that's not the point. WinZip is file-compression software, and data compression is based on some abstract mathematical principles, just like crypto. But WinZip doesn't ever let you know that it's doing something mathematically complex. It just presents you with a simple, easy-to-use graphical user interface.

Crypto software, on the other hand, rams its technical nature down your throat. Look at a sales pitch for crypto software and you'll see phrases like "11 trillion years to crack," "128-bit RC4," "168-bit triple-keyed DES in cipher-block chaining mode." Now I know my math pretty well; I've studied and even taught cryptography, and I understand what those terms mean. I know from experience that nine out of 10 crypto salespeople don't really understand it, but that doesn't stop them from quoting meaningless numbers for you. I also know that none of this information has

THISWEEK'S GLOSSARY

Certificate authority: This is the entity that issues, validates and revokes digital certificates that authenticate a vendor's Web site to the user. Microsoft includes software with Windows 2000 that allows its Internet Information Server to act as a certificate authority.

Data Encryption Standard (DES): An industry-standard cryptographic algorithm that has been widely used for decades. It's now being superseded by the Advanced Encryption Standard.

Triple-keyed DES: DES uses a short (56-bit) key and is therefore vulnerable to attack. One way of resolving this problem without rewriting all your software is to set DES to encrypt a message three times, with three different keys. This is sometimes referred to as 3DES.

Cipher-block chaining mode (CBC): A mode of operation of some algorithms that helps defend against a particular type of attack. You'll almost never need to know anything about CBC unless you are deeply involved in cryptography.

128-bit RC4: Another common cryptographic algorithm, written by Ron Rivest. Opinions are divided as to whether RC stands for the formal "Rivest Cipher" or the somewhat more prosaic "Ron's Code."

LINKS:

www.landfield.com/faqs/cryptography-faq/snake-oil/: This "Snake Oil FAQ" shows how to tell when you're dealing with a cryptocharlatan.

www.winzip.com: Mansfield, Conn.-based WinZip's Web site is the source for downloading the WinZip file-compression utility.

ever been the slightest bit of use to me as a security manager — except for the occasional bit of satisfaction at shooting down salespeople who let their mouths run ahead of their brains.

The next time anyone tries to browbeat you with obscure crypto terms, ignore him. Ask the crypto salespeople to explain what they mean in simple English. As soon as they start talking numbers, get them to start talking about people instead — the end users and how they'll understand and use the software.

When we have crypto software that's as easy to use as WinZip, we might actually get real people to use it. When we get real people to use crypto software, we'll dramatically improve data security. ■



Security Manager's Journal

■ This journal is written by a real security manager, whose name and employer have been disguised for obvious reasons. It's posted weekly at www.computerworld.com to help you and our security manager — let's call him Jude Thaddeus — better solve security problems. Contact Jude at jude.t@lycos.com or click on Computerworld.com's Security Watch community forum to participate in discussion topics.

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Comdex 2000: Everything Wireless, Web and Wacky

Annual show never fails to surprise with unexpected new products and technologies

BY RUSSELL KAY

WHERE HAVE all the wires gone? There were two dominant themes at Comdex this year: first, wireless everything, everywhere; and second, Internet appliances.

On the wireless front, there are a variety of standards and sort-of standards being pushed: the 1.6M bit/sec. HomeRF standard, which had its own small pavilion; 11M bit/sec. 802.11b Ethernet, offered by a gazillion vendors at high but falling prices; and finally, some actual Bluetooth products. There were also a number of "semiwireless" phone-line- and standard electrical-wiring-based networks.

Intellon Corp., a semiconductor maker in Ocala, Fla., was showing a 14M bit/sec. network capability over normal house wiring. Intellon calls the technology "No new wires." This approach can make use of special tools that go between a device's power cord and the outlet.

Looking ahead, however, Intellon is trying to get vendors of laptops, televisions, audio equipment and other electronic devices to incorporate part of the technology into their new products via a small, inexpensive chip. If the company's goal is realized, there will be no need for extra devices — the single power cord will also

serve as a network carrier.

D-Link Systems Inc. in Irvine, Calif., was showing an 802.11 wireless access point with an estimated selling price of \$350 — less than half what most of its competitors charge.

So much for networking. On the device end, Schaumburg, Ill.-based Motorola Corp. was showing its Accompli, which at first glance looks just like its Timeport two-way pagers. Then you see that the display is in color and learn that it's a phone, too. We may see this device in the next six months.

It's an Appliance

What's an Internet appliance? Almost anything that's not a traditional PC but can access the Internet: set-top boxes, e-mail appliances and Web pads. (We're not counting refrigerators this time around.) There were Web pads galore, in various shapes and sizes, but mostly with 8- to 10-in. screens, held like a tablet or clipboard, with a variety of CPUs running an equally broad variety of operating systems: Windows CE, BeOS, Linux and, for all I know, MVS and OS/390.

The Santa Clara, Calif.-based National Semiconductor Corp. booth displayed about a dozen models, all of which use National's Geode microprocessor. A company representative at the booth claimed that the devices shown are now shipping, but I haven't seen any outside

of shows and demonstrations.

Be Inc. in Menlo Park, Calif., seems to have hitched its star to the Internet appliance, announcing the BeIA Management and Administrative Platform for Internet appliances. The company was showing several attractive pads, including one by Compaq Computer Corp. code-named Clipper, that uses an American Micro Devices Inc. K6-2/266-MHz processor. Compaq is also selling a version of this product that uses Microsoft Corp.'s Windows CE 3.0. Pricing was undecided, but the 10-in. screen models were estimated at about \$1,000, with the smaller-screen models perhaps \$200 less. The BeIA uses a very different graphical interface, which is much simpler and friendlier than a typical Windows or Macintosh desktop.

Flat, Flat, Flat

Flat screens were everywhere at Comdex, and prices are falling. NEC-Mitsubishi Electronics Display of America Inc. in Itasca, Ill., announced a 17-in. flat-panel monitor priced at \$1,499 — that's what a 14-in. display cost just three or four years ago.

Most exciting to me, however, was a prototype display that Rochester, N.Y.-based Eastman Kodak Co. was showing.

Rather than the current LCDs, this new panel uses an organic LED. This process makes for a panel that's significantly brighter, uses much less power, needs no backlight, is basically no thicker than the glass substrate and has an extremely wide viewing angle, so you can stand off to one side and see it just as well as if you were standing in front of the panel. Oh, and it will also be cheaper to make than an LCD display.

Though Kodak holds numerous patents on this technology, a spokesman said the company expects to license it to anyone who wants it. It's likely to be 16 to 24 months before we see real products based on this technology, but I think it will

revolutionize how we use displays. And we'll finally get that television that hangs on the wall.

There was one flat-panel display that stood out from the rest. It's almost in the class of an answer that's looking for a question. Korean firm Top-head Inc. was showing moni-



SOME RADICAL COMPUTER designs at Comdex include the U-bunny (top), the U-Brulee and the shiny U-Classic

tors with two flat panels — one about 17 in., and one above that, which was about 6 in. The two panels showed different content, but you could move between them with the mouse. The industrial design was startlingly nonstandard, but the appearance of several quite different models seemed to indicate that the company is still searching for an identity.

The Neat and the Weird

Now that I've covered the major trends, I can talk about the really neat stuff and the really weird products out there.

I got to see a preview of Corel Corp.'s WordPerfect Suite

2002 (known internally as "double-oh-two"). The suite is getting what Graham Brown, Ottawa-based Corel's executive vice president of business applications, called "the best upgrade to the applications since the release of Corel WordPerfect 5.1." Scheduled to market in the first half of next year, the release will emphasize enhanced performance and better integration of Web-based functions. Demonstrations of WordPerfect 10 showed a more powerful user interface, with tabs, toolbars and other controls on all four sides of the editing window.

Matrox Electronic Systems Ltd. in Dorval, Quebec, was showing its new RT2000 real-time video-editing product, which combines two graphics boards, an external input box and software that enables the editing of raw digital video without the need for conversion. Also, Matrox has cleverly made use of its 3-D graphics board, the Millennium G450, to aid in special effects like page curls, explosions and the like. Essentially, the desired effect is modeled in 3-D, and then the video image is mapped to the 3-D surface; the hardware acceleration speeds the process considerably.

Small, Silly and Wacky

Allsop Inc. in Bellingham, Wash., was showing a clever polyethylene case that holds two CDs (all the cases I've seen before this hold just one). What's innovative is that there are two fold-in plastic tabs with holes in them. Fold them out, and you can file the holder in a three-ring binder.

I recently wrote about the new small-footprint, nonstandard-design PCs that are coming into vogue. But nothing prepared me for the line of appliance system designs shown by Eupa Tech, a division of Taiwanese firm Tsann Kuen Enterprise Co. Consider the U-Classic: It looks like a shrunken, chrome-plated steam radiator from ToonTown.

But that was relatively staid next to the U-Bunny. This computer uses a CD drive in which you see the full circle on the front panel. The cover for that CD is divided in half, each pink half raising separately to form... bunny ears.

I wouldn't have believed it if I hadn't seen it. ■



Where Is It Exactly?

The emerging Geographic Markup Language provides a standard, text-based way to describe location.
By Sami Lais

EVERYBODY'S got to be somewhere. And the emerging Geography Markup Language (GML) provides a standard, text-based way to describe that somewhere.

Text-based geographic-data description languages have existed for years among small pockets of users in different disciplines. But the description efforts never crossed disciplines and formats.

Starting With XML

GML makes that leap to a universal standard by taking as its starting point the emerging industry standard — Extensible Markup Language (XML) — says GML's principal author,

Ronald Lake, president of Galdos Systems Inc., a geographic information system consultancy in Vancouver, British Columbia.

XML schema are definitions written in a specific XML syntax of tags, which describe a particular kind of content, such as a person's name or the products on an e-commerce Web site.

GML schema define how you put geographic information into XML, said Kurt Buehler, chief technical officer at industry group OpenGIS Consortium Inc. (OGC) in Wayland, Mass.

A GML tag describes content, such as the geographic coordinates and properties of a coastline. How the information appears — as a solid line, colored blue, for example — would be determined through a style sheet.

Whereas XML is based on a document, GML is based on geographic features, such as buildings, roads, rivers and mountainsides. OGC defines a geographic feature as "an abstraction of a real-world phenomenon; it's a geographic feature if it's associated with a location relative to the Earth."

Each feature has certain properties, such as a name or height above sea level. It also has geometries. A geometrically complex geographic feature may comprise multiple geometry types, such as points and polygons.

Features may be grouped together as a FeatureCollection: the entire mountain. And FeatureCollections can be grouped together as a single, larger FeatureCollection: a mountain chain.

But it's important to note what GML is not, says Lake. Geographic data isn't synonymous with the graphic interpretation of that data, such as a map. GML can be used to encode, store and transport geographic data. It can let applications accept spatial data from multifunctional sources, manipulate it and combine it with non-spatial data and multiple formats of spatial data.

Map-styling software can locate GML elements and display them. By applying map-styler style sheets to GML data, users can represent combined data graphically as a map showing, for example, roads, school districts and population density.

"Many kinds of information have a geographic component," Buehler said. "If we can standardize on how that geographic component is presented, then we can integrate other data such as utilities information by using the GML schema to encode the geographic element."

Data, Not Pictures

OGC published GML 1.0 in May and includes it in its Web Mapping Specification (WMS) 1.0. WMS describes an interface that, via a Web browser, lets users build a map that merges data from multiple sources and formats. But the resulting JPEG or graphics interchange format (GIF) file is an image rather than manipulable geographic data.

OGC in WMS provides for GML as an output format, which lets users request the data on a geographic feature, such as a river or a road, rather than a map.

JUST THE FACTS

What GML Offers

■ Using different map-styler software, two users could create entirely different-looking maps from the same GML data, because GML describes geographical data, not how it should be displayed.

■ Users don't have to buy expensive mapping software. All they need is a Web browser, such as Microsoft's Internet Explorer, which supports vector graphics (geometry represented as a picture rather than bits).

■ Panning and zooming are immediate. Anyone who has tried to pan or zoom a GIF or JPEG map online has had to wait while the server generates a new view. A GML-based map already contains all the data and, effectively, all the views.

■ One format works for many uses. GML data can be displayed on any XML-enabled device, such as a personal digital assistant or cell phone as well as on desktop PCs.

■ GML facilitates embedding of links in features. Click on the opera house on a map and you're automatically taken to the opera house's Web page.

Note: For more information, go to www.galdosinc.com/reasons_for_gml.htm

SOURCE: RONALD LAKE, GALDOS SYSTEMS INC.

"The difference is that in the first instance, what you get is a picture of the data; with GML, you get the data," Lake said.

GML will also be an integral part of OGC's wireless Open Location Services (OpenLS) initiative, announced Oct. 30, to develop specifications for location-aware applications such as vehicle navigation, route determination and display, driver assistance and accident response, as well as map and feature display and interaction. ■

Bumps on the Road to GML Acceptance

Although GML is gaining support globally, there are still barriers to its adoption.

The Central IT unit of the U.K. government, which has standardized on document-tagging language XML, has also adopted GML 1.0 for exchanging geo-spatial data in its e-Government Interoperability Framework (e-GIF).

The U.S. Census Bureau has commissioned GML author Ronald Lake's company, Galdos Systems, to write a translator that will let GML users read the

agency's extensive TIGER GIS database.

But some in the geographical information industry say they think GML's creators and supporters may be too ambitious and that they doubt the efficacy of one evolving standard built on another evolving standard.

Another sticking point is that there are actually two GMLs. One industry consortium, led by Tokyo-based NTT Data Corp., has developed Geography XML (GXML) to support location-aware services available via cell phones in Japan.

GML was created by Lake to sup-

port a broader range of applications and now involves other developers around the world.

Work on both standards has continued for two years concurrently but along diverging paths, and it was only at the Oct. 6 meeting of the OGC that the two groups agreed to work to merge the two during the next six to 12 months.

Twenty years ago, the issue would have been of interest almost solely to government agencies, by far the main users of GIS. Not so today.

By next October, U.S. phone carriers will be required by law to be able

to identify the location of cell phone callers. Similar requirements are being considered for Europe.

GML is being built into other OGC standards that will facilitate such location-aware applications.

According to a report by San Jose-based Dataquest last year, "increased corporate use of GIS technology to improve customer service and cut costs is expected to help propel the overall market from \$862 million [in 1998] to \$1.7 billion in 2000."

— Sami Lais

Optim Resul

WHEN YOU WALKED into the supermarket recently, you may not have noticed right away that you were in a Markov process with a 3-D state space.

But you surely noticed those long lines at the checkout counters, and so have operations research (OR) specialists. They use queuing theory, Monte Carlo simulations, linear programming and other esoterica to shorten customer lines and delivery times, minimize inventories and wring more revenue out of airplane seats, rental cars and hotel rooms. And they depend on information technology to do it.

Today more than ever, OR techniques are impacting the corporate bottom line. And IT managers can deliver the technology to make it happen.

The term *operations research* dates to the late 1930s, when British and U.S. mathematicians developed ways to conduct research on military operations. For decades afterward, these powerful OR techniques saw little use at most firms.

But that's changing, as more companies use OR to improve operational efficiencies and increase revenue yields. Two forces are driving the surge in use: OR practitioners have gotten smarter at applying their tools, and corporate IT is now giving OR specialists the computational resources and databases they need. Indeed, experts say, the most successful companies will be those where OR and IT have established strong bonds of collaboration.

Million-Message Mailings

Recently, OR specialists at IBM worked with the IT department at Fingerhut Cos. to optimize the mailing of 480 million catalogs to 7 million Fingerhut customers.

Fingerhut decided to whom it would send each mailing, without regard to previous or future mailings. But the company wanted to map out a suite of mailings for each customer over time. That change, enabled by OR in a \$3 million project, reduced mailing costs by 6% while boosting profit by \$3.5 million annually, says Deb Campbell, business intel-

ligence manager at Fingerhut in Minnetonka, Minn.

Despite the financial success of the project, Fingerhut wasn't able to push the optimization as far as it wanted. With 1 billion possible combinations of mailings to each customer, the company's computers weren't powerful enough to evaluate every possible outcome. Instead, the model considered groups of similar customers.

"The problem was too huge," says Campbell. "We can't solve the sizing issue today, but maybe we'll have the solution in a couple of years."

Cues from Queues

Queuing theory — the use of probability principles and modeling to understand how lines form and behave — was developed in 1915 for analyzing telephone switching systems. It's now used in systems that not only analyze queues but also control them. Richard C. Larson, an MIT professor who goes by the nickname Dr. Queue, has developed a tool that can help retail outlets deploy workers in a way that both shortens lines and reduces personnel costs.

Larson says the math that underlies queuing theory, such as Markov processes, is now being augmented with models of human behavior. "For example," he says, "the Disney Co. is world-class at managing the psychology of queues, and every facility they build, they model first." Indeed, the injection of human factors into models is one of the forces moving OR from academia to corporate data centers, Larson says.

And thanks to IT support, OR now can go where it never could before. "A confluence of factors — data warehouses with gigabytes of data and the cheapening of computation — have facilitated a new wave of OR applications," Larson says.

Supporting OR is both an opportunity and a challenge for IT, he adds. IT managers should know something about OR, Larson says, so they can explain to users and senior managers where the "hidden value" lies in all that data they're collecting.

IT managers "are looking for job security and growth and should structure things so the OR people know about the data sets and how to get more

IT-powered advances in operations research can enhance business processes and boost the corporate bottom line.
By Gary H. Anthes

ma ts

profitability out of them," Larson says.

Warren Powell is a professor of OR and financial engineering at Princeton University in Princeton, N.J. As director of the school's Castle Laboratory, he helps transportation companies optimize the placement of their assets. Castle has just two application programmers who write the optimization models for its clients, but "the heavy lifting is on the data side, and that's all done by in-house IT groups," Powell says. "That's the hard part of the project."

IT plays a strategic role in modern OR projects, Powell says. In the past, OR models often failed because they erroneously assumed they had complete and correct input data. "The new way of thinking is, I've got to model information the way it exists in the real world," he says. "This is where we are bringing the IT world into the OR world."

Modeling for Dollars

Michael Schrage, a research associate at the MIT Media Laboratory in Cambridge, Mass., urges companies to make extensive use of simulations, prototypes and models. He argues in his book *Serious Play: How the World's Best Companies Simulate to Innovate* (Harvard Business School Press, 2000) that the benefit comes less from the models' output than from the very act of modeling. The management insights gained through playing with models will shape the

most successful companies in the future, he predicts.

Schragre argues that IT and OR should join forces to promote the use of OR, which, he says, often scares off general managers. "I think we'll see an explosion of OR, but you have to make it more accessible," he says. It should be possible, for example, to construct an intranet Web site at which general managers could run their own simulations.

Some companies are already at the state of modeling awareness and appreciation that Schrage advocates. All employees of Level 3 Communications Inc., a telecommunications company in Broomfield, Colo., are expected to have basic knowledge of three disciplines: economics, finance and optimization. Lorraine Lotosky, vice president of business optimization, says Level 3 has saved tens of millions of dollars by applying OR techniques to network design.

Lotosky, whose 15-person OR group is outside of Level 3's IT organization, says she feels it's so important to have tight links between the two disciplines that she employs her own application programmers. "OR could be in IT, or it could be anywhere there is a sponsor," she says. "But I like to have an IT function within the OR unit itself."

Fingerhut's Campbell says her OR group was recently put inside IT. "This latest move... will hopefully bring the development of an idea and the implementation of the idea closer together," she says. ▀

OR Software Sources

Just where do you get operations research software?

A big company might just roll its own. In fact, IBM developed a system that optimizes inventory levels in its PC manufacturing supply chain, saving the company \$750 million in 1998.

IBM now sells the system as its Asset Management Tool. But implementing that product is no slam dunk, says Brenda Dietrich, a senior manager at the IBM Research Division's Optimization Center. "You need some expertise in OR... I'd say someone with a master's degree in OR could use it very effectively."

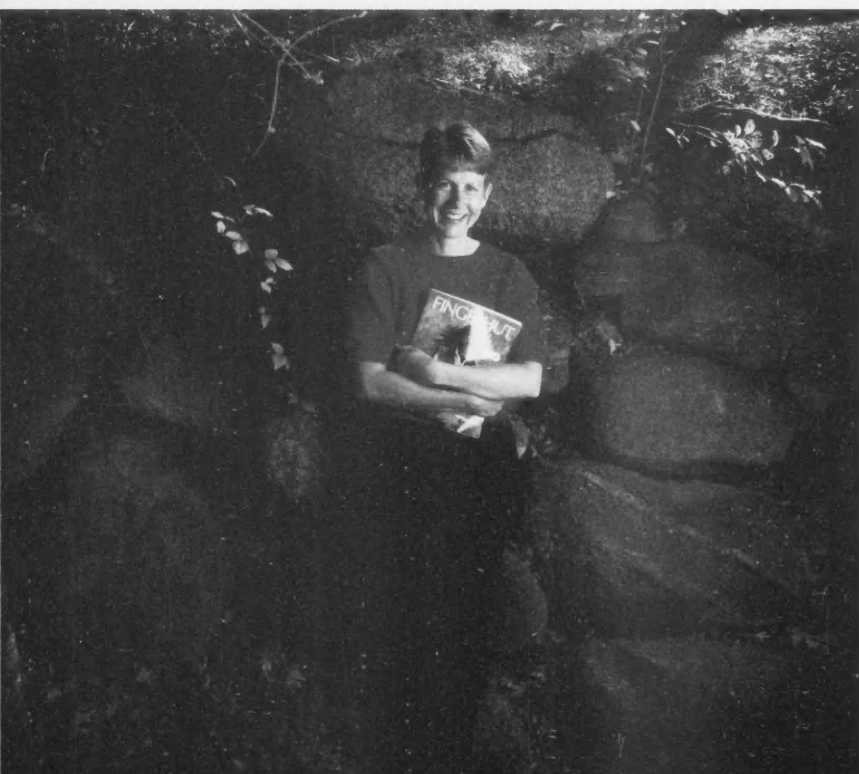
Supply-chain software from the major enterprise resource planning (ERP) vendors has some OR capabilities. "Some are integrated, so you don't even see it," says John Birge, president of the Institute for Operations Research and the Management Sciences in Linthicum, Md. "It might just tell you, 'Route your trucks this way,' and you have no idea it's optimizing in the background."

But Birge, who is also dean of the McCormick School of Engineering and Applied Science at Northwestern University in Evanston, Ill., says standard ERP packages can make unrealistic assumptions, such as unlimited parts access. So users may want to use an OR software specialty company, he says.

For example, Ilog Inc., Manugistics Group Inc. and Aspen Technology Inc. have supply-chain optimization packages, some tailored for specific industries.

"They have some general-purpose tools that you have to be fairly expert in to use," Birge says. "But they... can develop more application-specific tools for you."

"IT managers should know what OR can do for them," Birge says. "They should know what applications have been developed by the specialized software houses and then decide if they need those capabilities." If they do, he says, they should consider having an OR-trained consultant install them and train users. — Gary H. Anthes



DEB CAMPBELL, business intelligence manager at Fingerhut, used operations research to optimize catalog mailings

Saving Y SAN Dollars

Avoid overspending on storage-area networks by matching features to your needs. By Charles T. Clark

MOST IT MANAGERS KNOW ABOUT the explosion in storage requirements that's been driven by e-commerce and other applications, and most have heard vendors extolling the virtues of storage-area networks (SAN) as a way of consolidating and better managing storage resources. But what's not so clear is the balance between costs and benefits.

Everyone offers the basic components — high-speed Fibre Channel hubs or switches that provide the high-speed 1G byte/sec. SAN backbone to which vendors attach disk arrays, tape libraries, optical disks and other resources. Servers access the SAN either through Ethernet bridges or by direct connection using a Fibre Channel host adapter.

Around this infrastructure, vendors add value by wrapping their own performance-tuning and management tools and by adding features ranging from the ability to dynamically reallocate storage among servers to fault-tolerance schemes. Each function you choose, however, adds to the total cost.

SANs are expensive, and prices vary widely. So what do you get for your money? What features do you really need? And what can you really afford? The three companies profiled below each had differ-



Your Dollars



ent storage requirements. And each chose a different vendor, spending from less than \$200,000 to more than \$1 million. Here's what they got in return.

Mission-Critical

WorldStor Inc. in Fairfax, Va., is a storage service provider, offering storage as a utility to companies that have elected to outsource their storage operations. The company needed very high reliability because of the nature of its business and wanted a vendor with a proven SAN architecture.

Says Steve Bishop, the company's chief technology officer, "We stepped back and looked at exactly what we were trying to provide: an enterprise-class storage utility service that customers could bet their data on."

Bishop eliminated some vendors almost immediately. "The reason that we did not look too closely at some [vendors], including Compaq [and] Xiotech... is that we knew these companies were not far enough along in their development cycle to provide us with an architecture that was as stable and as well-tested as one from one of the big players," he says.

Bishop ultimately chose four EMC Corp. Symmetrix SANs, for two reasons: EMC's proven architecture and its extensive portfolio of management software. "Supplying raw capacity is the easy part [of our business]; it's managing the availability and the performance of the data that resides on that storage that poses the challenge. And those challenges are the very things that EMC develops its software to address," Bishop says.

He has worked with the SANs for a year and says they're "rock solid. We haven't had any issues." The four SANs hold between 5 and 10 terabytes (TB) of data each and use EMC's Symmetrix 8730 and 8430 storage array controllers, its Celerra File Server to make SAN volumes appear to remote clients as network-attached storage and its Connectrix Fibre Channel switches.

WorldStor makes extensive use of EMC's Control Center management software, plus Symmetrix Remote Data Facility for storage mirroring, TimeFinder for replication, Volume Logix for storage virtualization and Symmetrix Data Recovery software.

WorldStor's Symmetrix SAN didn't come cheap — Bishop says that the multimillion-dollar price tag that his company paid for its four EMC SANs is high, but he adds that WorldStor has saved thousands of dollars in software development costs because it was able to purchase software tools from Hopkinton, Mass.-based EMC instead of developing them in-house.

"So, in the long run, our total cost to offer the service to our customers, we don't believe, is any more

expensive than some of the [storage service providers] in this space that are attempting to use more commodity-based products," Bishop says.

The Middle Road

When senior managers at Hannaford Bros. Co., a 112-store grocery chain based in Scarborough, Maine, first asked Doug Roberts, manager of network services, to look into a new SAN in 1998, they asked him to come up with a design that would tie into heterogeneous environments, including Unix, Windows NT and OS/390.

EMC was the only company that offered this capability, but it was unwilling to take systems responsibility for all SAN components. So Roberts focused on building a homogeneous system to support his seven Compaq ProLiant 8500 Windows NT servers, which provide e-mail, file and Web services. The applications weren't as mission-critical as the core business systems, but high availability was a requirement, particularly for file sharing and messaging, Roberts says.

He evaluated offerings from EMC and Compaq Computer Corp. But he chose Compaq's StorageWorks last December because not only would it provide all of the equipment, from the switches to servers and the disk arrays, but it would also support it.

"That's the big difference between the way EMC works and the way Compaq works," Roberts says. "EMC would point to Bus Logic or Brocade or Compaq and say, 'Those guys have the problem.'"

But EMC, whose Symmetrix SAN continues to run in Hannaford's mainframe environment, "is getting better," he says.

At the time, Compaq was also cheaper. "[EMC's] Connectrix switch... compared to the cost per connection in the Compaq system, was tremendously expensive," Roberts says.

Hannaford's StorageWorks SAN, deployed in April, consists of 2.6TB of storage, three StorageWorks RA8000 disk arrays, two eight-port Fibre Channel switches, a 16-port Fibre Channel switch and two RAID controllers. Roberts says the total price of the SAN, including the disk storage array, switches, host bus adapters and software (but not including the servers or installation), was approximately \$250,000.

Roberts says the SAN improves the performance of his Notes servers dramatically. "We use RAID 5 in StorageWorks, and that's a six-channel connection to the disk. So it's very, very fast, and that really helps our Lotus Notes environment," he says. Similarly, the SAN delivers excellent file-serving performance because it provides access to a large amount of disk space.

For higher availability, Roberts uses SecurePath. Compaq's multipathing utility that reroutes disk data to an alternate path when it detects a failure on the host bus adapter, cable or controller and provides dynamic load-balancing to improve I/O efficiency. "If any component fails, the SecurePath software switches the route to a different SAN path without a glitch," he says. Roberts says he can easily change paths manually with a drag-and-drop procedure.

Roberts concedes that "Compaq's variety of systems they can connect to is immature. Compaq doesn't have the wide range of offerings that EMC does." That wasn't a factor for the project, but it's one reason an EMC SAN still runs on Hannaford's mainframes, Roberts says.

Roberts saved money by doing the setup in-house, but it wasn't easy. "The installation really requires a typical propeller-head," Roberts says. "But once the SAN is installed, running and documented, it works



Availability comes down to more than just hardware redundancy.

DAVID HILL, NETWORK ADMINISTRATOR,
ANDERSEN CORP.

very well, and the tools do exactly what Compaq says they will do."

The Value Approach

David Hill, a network administrator at Andersen Corp., a manufacturer of windows in Bayport, Minn., says the data on the company's Windows NT servers has been doubling every 11 months for the past few years. As a result of this data explosion, Hill had been experiencing server disk I/O problems on his Exchange servers and problems backing up the data on those servers. By installing a SAN, Hill says, he hoped to solve both his backup and disk I/O problems with one product.

Hill looked seriously at EMC, Santa Clara, Calif.-based Hitachi Data Systems Corp. and Hewlett-Packard Co. before choosing Eden Prairie, Minn.-based Xiotech Corp.'s Magnitude SAN. Andersen's technical committee reviewed proposals from all the vendors and cut the field down to finalists EMC and Xiotech before making its final choice.

The committee's criteria included interoperability, scalability, ease of use, the ability to operate in a heterogeneous environment (Unix and Windows NT) and price. It chose Xiotech because, for Andersen's needs, it stacked up well against the competition in all of those categories and cost less, Hill says. The total price tag came to less than \$200,000.

Andersen uses two Xiotech SANs — one for development and a second for production. Each includes a single host bus adapter, one 16-port Fibre Channel switch and 24 50GB SCSI drives (for 1.2TB of storage). The production environment services nine HP NetServers running Windows NT. Hill says he also plans to add Unix hosts to the production SAN. Software components included Xiotech's Redi Storage

management software, Volume Director (for storage virtualization) and Zone Manager (for zoning).

So far, Hill says he is impressed with the Magnitude SANs. "Availability comes down to more than just hardware redundancy," he says. "There are lower-cost solutions that adequately provide the hardware platform. Xiotech does that very well." Hill says the storage management software has been easy to use, and setup also went smoothly thanks to the plug-and-play nature of the product.

Final Decision

Choosing the best SAN for a company's needs and budget can be daunting, but some choices are clear. For high availability in mission-critical data centers, established SAN vendors such as EMC and Hitachi offer a mature architecture, sophisticated management and support capabilities, and an established track record (although companies like Compaq and Xiotech also offer high-end configurations and are closing that gap).

For less-critical needs, offerings from Compaq, Xiotech and others may offer what you need for less. But users suggest comparison shopping, since EMC and other high-end vendors also offer lower-end configurations and all vendors tend to discount substantially below initial sticker prices. A seemingly expensive SAN may actually end up being the more economical choice.

As it turns out, you can't buy a SAN on a shoe-string budget. But with some smart planning, you can get the most cost-effective SAN for your company's needs — and perhaps save hundreds of thousands of dollars in the process. ▀

Clark is a freelance writer in Haverhill, Mass.



Supplying raw capacity is the easy part [of our business]; it's managing the availability and the performance of the data that resides on that storage that poses the challenge.

STEVE BISHOP, CHIEF TECHNOLOGY OFFICER, WORLDSTOR INC.

SAN Features Shopping List

In addition to the basic hardware, SANs include a mix of features that can add considerably to overall cost. The key is to determine which features you need up front. Here's a quick rundown of common features — from the basic to high-end functions — and why you might need them.

Zoning

This basic function allows the grouping of SAN ports (and associated devices) by function or location so that many servers can share the same storage devices. While devices may be included in more than one zone, only devices in the same zone can "see" one another.

LUN masking

This basic feature keeps one server from overwriting a volume used by another server. Assigning logical unit numbers (LUN) is a way for a RAID storage system to present a hard-disk drive to a server. A basic SAN function, LUN masking makes specific LUNs (and hence devices) visible only to specified servers within the same zone.

LUN mapping

This is the ability to take one LUN and map it as different LUNs to multiple servers. It al-

lows the SAN to work with some finicky server host bus adapters (HBA) that expect LUN numbers to appear in a specific order. This is less of a problem with newer HBAs.

Dynamic storage allocation

This allows available physical SAN storage resources to be reallocated among servers as needed.

Storage virtualization

This is the ability to carve up SAN storage from the physical drive pool into virtual drive volumes that can be shared to heterogeneous server environments. This level of abstraction makes volume management easier.

Nondisruptive backups

Software that manages SAN backup and restoration processes with minimal disruption to SAN performance. Tools are available from both SAN vendors and third-party suppliers.

Snapshot copy

To avoid performance hits from backups, users often create off-line copies of their data. But copying all blocks in a disk volume takes time. A snapshot copy takes a picture of the target volume's current state, creating

a table of tracks, sectors and volumes that can be used to start backups sooner so they can be completed earlier — an important consideration when backup times are long.

Remote data mirroring

This enables the creation of remote mirrored data sets for rapid disaster recovery.

Remote data replication

Also called remote copy, it creates off-line mirror images of active production volumes that can be used to run data integrity checks and other tasks in parallel and without affecting response time performance of live data.

Multipathing

A fault-tolerance feature that reroutes data to an alternate path when an HBA, cable or controller fails. It may also provide dynamic load-balancing by rerouting data in the SAN to improve efficiency.

Serverless backups

This feature allows backups to take place across the SAN without server involvement. The device or software uses the Network Data Management Protocol to respond to a server agent's backup request to move data

directly between SAN-attached disk arrays and SAN-attached tape storage. This feature requires special software from a tape backup vendor such as Pathlight Technology Inc. in Ithaca, N.Y. The relatively new, high-end feature can be expensive to implement.


Application fail-over

This feature supports clustered servers that have access to one another's data volumes but don't have to be running the same applications. When Server A fails, Server B accesses Server A's volume, launches the failed server's applications, accesses the data and takes over the function. This approach results in some downtime because the application must launch on Server B and users may need to reconnect.

Clustered application support

This is the ability of an application operating in a server cluster to pool multiple server resources together. When one server fails, the other keeps the application running against the same data volume. For users, the fail-over is seamless. Some SAN vendors offer features that enable this process to work more smoothly.

— Charles T. Clark



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Fault-Tolerant Computing

BY JAIKUMAR VIJAYAN

REMEMBER THE old Federal Express slogan: "When it absolutely, positively has to be there overnight?" That's a lot like the demands on today's computer systems, except that what they need isn't overnight delivery but nonstop operation, regardless of problems with individual hardware or software components, power failures or other kinds of disaster.

The term for this concept is fault tolerance, which is built into software, comes as a part of hardware or is provided by a combination of the two.

Companies — especially in the financial services and airline industries — have used fault-tolerant configurations to protect some of their most vital and core applications for several years now. But e-commerce and globalization are increasingly driving demands for continuous levels of service availability across distributed environments as well.

Fault-Tolerant Players

Vendors in this market include Stratus Computer Systems in Maynard, Mass.; Compaq Computer Corp., with its NonStop Himalaya systems; IBM, with its SP systems; and Boxborough, Mass.-based Marathon Technologies Corp., a vendor of fault-tolerant configurations for Windows NT systems.

It's important to distinguish between fault tolerance and high availability — a term it's often confused with, analysts say. Both fault-tolerant and high-availability configurations are designed to maximize application and system availability. Both use backup resources — like mirrored servers and disks — as a fundamental approach for recovering from a failure.

But while the goal of high-availability configurations is to help firms recover quickly from a crash, that's not good enough for fault tolerance — or for continuous availability, which seeks to eliminate the

DEFINITION

Fault-tolerant computing describes an environment that provides continuous, uninterrupted service — access to data and application programs — even when a hardware, software or network component fails.

recovery time completely. The emphasis is on application takeover and not merely fail-over to a new server. "There is a qualitative and quantitative difference between the two," says Jean S. Bozman, an analyst at International Data Corp. in Framingham, Mass.

"With fault tolerance, you are talking about five minutes or less of downtime a year. With high availability, you have a fail-over time," which can vary quite a bit depending on the configuration, according to Bozman.

"Fault tolerance is about true redundancy at a physical level where any component can fail and nobody knows about it even for a second," says Gary Collins, manager of computer operations at K-B Toys in Pittsfield, Mass.

In Lockstep

As a result, all systems in a fault-tolerant configuration feature a high degree of built-in hardware redundancy, serviceability and remote management capabilities. All main hardware elements — such

as CPUs, memory and disks — are duplicated. All redundant components execute all processes in lockstep.

Replicated components perform the same instructions at the same time, so even if one were to fail, the application would keep running without change. As a result, administrators can add capacity, run routine maintenance or remove failed components without taking the whole system down.

"You are talking about two systems running the same load at the same time. In case one fails, you don't lose anything," Bozman says.

Compaq's NonStop Himalaya servers provide one example. The systems are composed of a cluster of processors — each with its own memory and copy of the operating system — working in tandem but completely independent of one another.

The servers use a concept called process pair, which consists of a primary process and a backup process that run on separate processors. The backup process mirrors all the information in the primary process and is able to instantly take over in case of a primary processor failure.

Hardened operating systems, onboard diagnostic tools and sophisticated workload-management software complement the redundancy.

Among other things, such fault-tolerant software is designed to prevent the loss of data during failures and to manage tasks such as forced switchovers from a failed system. The goal is to detect hardware problems that are about

to shut down a system and quickly redistribute the workload to other systems.

Stratus' fault-tolerant software, for instance, monitors the use of CPU, memory and disk resources and constantly compares it against user-defined thresholds.

The systems are capable of alerting administrators or the vendor directly in case of an impending failure.

Such capabilities were critical for e-Smart Direct Services Inc., says Mischa Weisz, president and CEO of the Etobicoke, Ontario-based company.

As a provider of electronic-payment processing and authorization services for retailers and financial institutions,

“

"Fault tolerance is about true redundancy... where any component can fail and nobody knows about it even for a second."

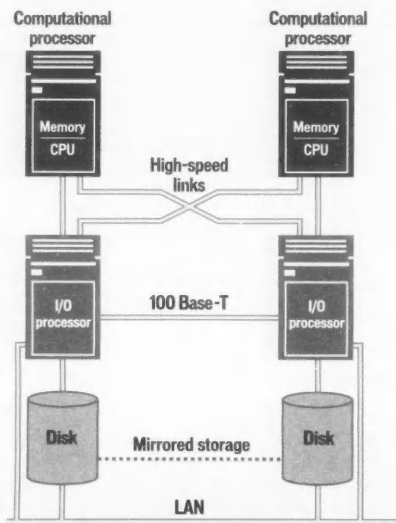
GARY COLLINS, MANAGER,
COMPUTER OPERATIONS,
K-B TOYS

Weisz explains, "we need a platform that is 24/7 without question."

The company's fault-tolerant environment is largely based on Stratus' technologies and delivers near 100% system availability annually, according to Weisz. "To me, fault tolerance means if something happens in one place, the hardware and the supporting software are capable of seamlessly transporting [applications] to another place for continuous service," Weisz says. ■

Finding Fault

This is the four-server architecture used by Marathon Technologies to ensure fault tolerance in Windows NT networks:





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Interface Card Gives Servers Extra Punch

Alacritech's smart network adapter takes a load off busy servers, backup devices

BY ROBERT L. SCHEIER

NOT ALL the big ideas in hardware come from giant companies. Consider Larry Boucher, who founded Milpitas, Calif.-based storage firm Adaptec Inc. and Santa Clara, Calif.-based Auspex Systems Inc., a pioneer in network-attached storage devices.

Boucher's latest company, San Jose-based Alacritech Inc., is shipping a network interface card that it claims can boost the amount of TCP/IP data a Windows NT server can handle by as much as 800%. The cards off-load some of the most demanding work from the main server microprocessor to a specialized processor on the network adapter, freeing the server CPU for other work.

This extends the life of existing servers while reducing the number of servers that information technology managers must support, says William Hurley, an analyst at The Yankee Group in Boston.

Alacritech claims its network adapters, tested against those from Intel Corp., can cut CPU utilization from 100% to 22%, in some cases, and improve network throughput from 425M bit/sec. to 872M bit/sec.

One Step Ahead

At least for now, Alacritech has a unique implementation of this process called TCP/IP off-load that beats network adapters from larger competitors such as Intel and Santa Clara, Calif.-based 3Com Corp., analysts say. While they haven't seen 800% performance improvements, several customers say Alacritech's cards hold enormous benefits for application servers and e-commerce servers that back up massive amounts of data.

Boucher, who is both chairman of Adaptec and president and CEO of Alacritech, says the new cards off-load only the portion of the Transmission

Control Protocol (TCP) that examines the packets traveling to or from the network. It then assembles them in the proper order and delivers them to the receiving application.

The concept of such off-loading isn't new. What is unique, says Boucher, is off-loading only the TCP work and giving it to specialized chips, which

Alacritech designs and outside manufacturers build.

Boucher says he was unimpressed when "industry experts" told him this combination, which makes the technique affordable for mainstream use, was impossible to achieve. "If it can't be done," he says, "then it ought to be an interesting thing to do."

Rick Halbardier, a project coordinator at the Washoe County, Nev., IT department, says he found the benefits "incredible." He says he first considered Alacritech's cards to eliminate bottlenecks caused by the Fast Ethernet cards on some Windows NT servers. Alacritech's approach seemed less expensive than moving to Gigabit Ethernet, he says, but he was reluctant to test it on a high-level production server. He tested it on a backup server and saw data transfer rates go from 200M to 350M bit/min.

Impressed, Halbardier installed Alacritech cards on the servers that were originally experiencing performance problems. It not only eliminated the bottlenecks, but he estimates that it also gave him better performance than he would have gotten by upgrading his entire network to Gigabit Ethernet — and for less than half the cost.

Compared with standard network adapters, Alacritech cards showed an approximately 20% improvement in data transmission rates, says Ira Goodman, a technical support manager at Syncsort Inc., a backup-management software vendor in Woodcliff Lake, N.J. Alacritech, which is just beginning to ship products and record revenue, faces major, well-funded competitors in Intel and 3Com and is limited by the fact that it supports only Windows NT 4.0.

Alacritech plans to deliver Windows 2000 and Linux support in the second quarter of next year. It's also planning to offer support for Sun Microsystems Inc.'s Solaris, but it has no delivery date set. But for now, it's alone in a promising market, with \$22 million in funding and Boucher's reputation to keep it on the radar screens of IT managers.

Scheier is a freelance writer in Boylston, Mass.

the buzz
STATE OF
THE MARKET

Everyone's Getting Smart

For now, Alacritech is targeting the market for network interface cards only in servers running Windows NT, which the company estimates has an installed base of 30 million systems.

But then there's another, potentially massive market: Using Alacritech's cards to speed up data backup can make a big difference, when storage requirements at some companies are growing by as much as 100% per year.

The idea of off-loading functions to a network interface card has also occurred to Intel and 3Com. Both have already shifted some functions, such as encryption using the IPSec standard, to network interface cards, but the companies are more cautious about other parts of the TCP/IP protocol.

Intel Corp.

Hillsboro, Ore.
www.intel.com

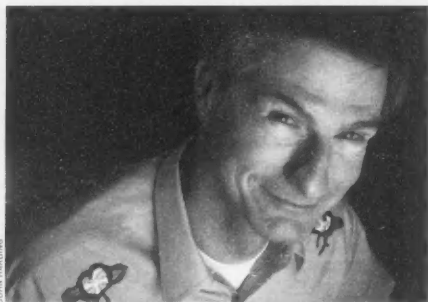
Intel claims that IT managers want cross-platform support as much as they want sheer throughput. For that reason, Intel off-loads a more limited part of TCP/IP to its cards than Alacritech does. But Intel's cards work not only with Windows NT 4.0 but also with Windows 2000, Solaris, Linux and Unixware, says Willem Wery, director of marketing for Intel's CPU products.

Intel currently off-loads checksum functionality, which checks each unit of data to be sure it contains the correct number of bits. Intel will also support a new TCP off-load capability called TCP Segmentation, expected to be available for Windows 2000 by the middle of next year. This capability should ease CPU loads and boost the performance of Intel adapters by allowing the operating system to hand larger blocks of data, or frames, to network interface cards for transmission.

3Com Corp.

Santa Clara, Calif.
www.3com.com/products/nics.html

While off-loading the entire TCP/IP protocol stack from the main server CPU "is very valuable," 3Com currently has no products that do that, says Doug Moe, product manager for server network interface cards. 3Com is "currently investigating" how to off-load TCP/IP functions from the main server CPU, he says, and will support the checksum, TCP segmentation, transport and tunnel-mode encryption off-load capabilities in Windows 2000. — Robert L. Scheier



"IF IT CAN'T BE DONE, then it ought to be an interesting thing to do," says Alacritech President and CEO Larry Boucher

Alacritech Inc.

Location: 234 E. Gish Road,
San Jose, Calif. 95112

Telephone: (408) 287-9997

Web: www.alacritech.com

Niche: Network interface cards that speed server performance by off-loading TCP/IP processing from the CPU

Why it's worth watching: This new product area could have broad applications for both networking and storage.

Company officers:

- Larry Boucher, president, CEO and founder
- Richard Blackburn, vice president of engineering
- Esther Lee, chief financial officer
- Russell Lait, vice president of operations

Milestones:

- 1997: Founded
- April 2000: First product ships
- June 2000: Joins 10 Gigabit

Ethernet Alliance

Employees: 42

Born money: \$22.38 million from Benchmark Capital Partners, Institutional Venture Partners, Alloy Ventures Inc. and Berkeley International Capital Corp.

Products/pricing: 100x2 Dual-Port Server Adapter for \$399; 100x4 Quad-Port Server Adapter for \$599

Customers: Washoe County, Nev., IT department; Syncsort; and American Lock Co.

Red flags for IT:

- The products lack certification from major hardware vendors.
- The company currently supports only Windows NT 4.0.
- Alacritech is first to market today, but with competitors like Intel and 3Com, can the company compete in the long term?

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Technology in The Tidewater

There are plenty of IT jobs to be had in the Chesapeake Bay region, but the markets vary dramatically among Virginia, Delaware and Maryland.
By Erik Sherman

FROM NORTHERN VIRGINIA, past Washington and up into Maryland and Delaware, the Tidewater region might better be discussed in the plural. It's more like three distinct regions, each with its own identity, traditions and set of industries.

The savvy information technology professional who's considering a career in that section of the Mid-Atlantic states must be careful to choose exactly which flavor will ultimately be the most satisfying to him.

Business Climate

The most obvious difference among the three areas is the types of businesses that thrive in each. Northern Virginia is home to Internet companies such as America Online Inc. in Dulles, as well as biotechnology research firms and companies supporting both the government and the military. The focus changes as you move north.

"In Baltimore, we're a little port," says Brian Ocheltree, CEO of E.magination Network LLC. "We're on the water, so there's a lot of shipping around here. There's manufacturing plants." There are also notable health care institutions such as Johns Hopkins Medical School.

It's very different from the saturation of white-collar businesses in Washington and Virginia. The Baltimore job market is also unusual for the Mid-Atlantic region, according to Buster Houchins, managing director of Mid-Atlantic operations at Christian & Timbers, a Cleveland-based recruiting company.

Outside Maryland, manufacturing falls off, Houchins says. The biggest financial institutions don't make an appearance until you reach Delaware, which has its share of such companies, including Provident Mutual Life Insurance Co.'s service center in Newark and MBNA America Bank N.A. in Wilming-

ton. Delaware is also home to Du Pont Co. in Wilmington.

There is certainly plenty of work to be found in the region, though the specifics depend on what you do and where you look.

According to the U.S. Office of Technology Policy, Virginia as a whole is ranked third in the projected number of IT employees per state, with 135,100 expected by 2006. In terms of the expected percentage of total employment that IT workers will represent in 2006, Virginia leads with 3.7%.

Delaware is tiny in comparison, with an anticipated statewide IT employment rate of 6,550 in 2006, which is expected to be 1.4% of total employment. This number must be taken with a grain of salt, as Du Pont alone reportedly has several thousand IT employees.

Projections for Maryland weren't available at the time of this report, but "there's a shortage of 10,000 IT folks in the Baltimore/Washington corridor," says Jamie Spriggs, executive vice president and CIO of Web-based benefits firm RewardsPlus Inc. in Baltimore.

Not Interchangeable

Because of the segmentation of industries in each of the three regions, someone with a particular background — say, in health care — might find a position more easily in one area than in another. And living in one area might make it difficult to take a job in another. Those in Northern Virginia wishing to work in Baltimore, for example, would have to fight the brutal traffic around Washington, which has one of the worst commutes in the country.

Typically, finding candidates for jobs is difficult in the Tidewater area.

"Overall, the East Coast — the Mid-Atlantic states in particular — are just booming," says Richard Bordelon, an account executive at The Richmond

Group USA, a job placement firm in Richmond, Va. "I'm seeing an across-the-board, ever-increasing demand — everything from senior management down to entry level. And technology is even tighter."

Money

The income you can expect will depend strongly on the region in which you work. For example, in Northern Virginia, salaries are high.

"In Fairfax County in 1998, \$80,000 was big money," says Bordelon. "That \$80,000 is \$100,000 now. I'm not working a position right now below \$80,000."

It's a good thing, because that part of Virginia is also expensive, with Fairfax County ranking near the top nationwide in terms of per capita income. The answer for many IT employees is to live 20 or more miles from work, in lower-cost areas of the state.

Looking at Baltimore, "my average programmer probably makes \$75,000," says Ocheltree. "The rest of the IT crew are probably more around \$55,000 or \$60,000," far below the prevailing salaries just a little south.

Recruiter's View

Much of the opportunity in the Tidewater region is owed to the demands of Internet-based companies, even with the recent plunges in the stock market. Consider what's possible for a chief technology officer or vice president of either development or engineering.

"Those positions that 18 months ago would have been more focused on equity and less on cash, we're seeing those people want both," says Houchins. A CTO at a start-up in the business-to-business infrastructure space can expect cash compensation of between \$250,000 and \$300,000, including bonuses. That's in addition to equity.

"If you looked at it 18 months ago, it would have been in the \$180,000 to \$200,000 range," Houchins says.

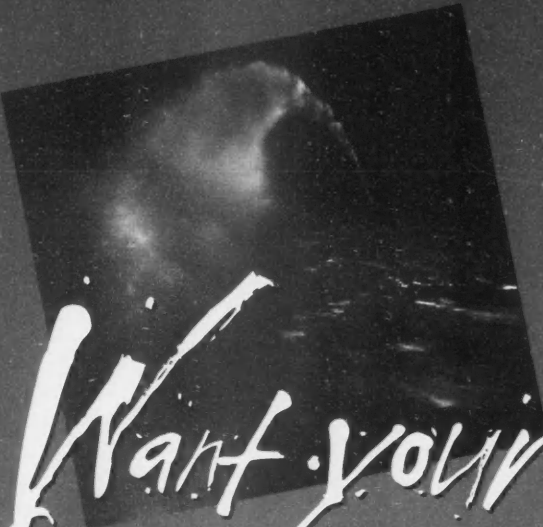
Nevertheless, the highflier may still find a hard fall at the end of the day.

In Bordelon's view, too many companies are spending too much money on technology that they either don't understand or don't need, he says. "There's an IT manager in Delaware who thinks he needs a B2B strategy, and he doesn't," says Bordelon. "He read it somewhere."

As a result, positions and opportunities can sometimes vanish as quickly as they appeared.

"I had a dot-com pay me \$80,000 in March [for finding three candidates]," says Bordelon. "Two months later, they had laid off two out of those three. They paid me three weeks previously. What a waste of everybody's time." ■

Sherman is a freelance writer in Marshfield, Mass.



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Hot Companies: How The

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The best equation, companies have found, is that keeping employees is the best way to attract employees. They talk about the opportunity to work with other bright, passionate people, about finding ways for the company to appeal to unique tastes and needs, and they acknowledge that the challenge of the work is more important than the pay when it comes to keeping good people.

The data says IT companies and organizations are posting employee turnover in the double-digits. The companies featured here are looking at turnover rates below 10 percent – and they continue to work to drive them down still further.

CABOT CORPORATION, BOSTON, MA

Among the top IT employers in the country, with a 95 percent retention rate, is a company known most for what it brings its customers in specialty chemicals, energy and materials. Cabot Corporation, with 39 operating plants in 23 different countries, has 125 IT employees.

Among the reasons for the low turnover? Cabot uses a selection process that relies on relationships. "We tend to hire people who have worked with us in some type of consulting basis," explains Craig Bickel, vice president and CIO. "We do a lot of work to assure that people fit with our culture and bring the experience we need. We're not looking for people for a project. We're looking for people who will build a career here."

Bickel says the company is able to attract top-flight talent for several reasons. "We have the standard things like signing bonuses and relocation packages," he explains. "We also have short-term stock options and long-term restricted options. High performance people tend to reach the short-term award fairly quickly."

However, he claims that compensation is just one point. "What employees tell me is that they like the flexible and empowered work environment. We have a fairly active IT environment – right now we're going through a global renewal of all our core business applications based on re-engineering of the businesses and standardized processes," Bickel says. "We will be one of the very few companies who will use a global model of ERP, using all languages. We'll use this as a foundation for our e-business strategy."

Bickel counts off several other reasons employees stay with Cabot. "There's a strong link between business and technology, partnered with business leadership," he

says. "Our infrastructure people in the operational parts of the business share in the analysis and decision-making regarding the selection of technology instead of relying on a separate new technology group. We work globally, giving everyone a chance for assignments in other countries and working with other cultures. Our jobs are fairly broad, combining and developing project management, analysis and implementation skills. This means people can gain management skills while maintaining currency in technical skills. We also are a flexible company, encouraging employees to make life choices that combine balance with work needs."

Currently Cabot is looking for IT experts to assist in connecting internal e-business operations with portal technology; e-business analysts to develop commercial applications, people with database management and content delivery skills; and people with understanding of work flow and application integration.

EQUIFAX INC., ATLANTA, GA

If anyone can tell the Equifax story for potential employees, it's current employees. According to Katherine Crew, vice president of human resources for Equifax's technology group, "Our employees are highlighted at hot internet job and interest sites, giving their own view of Equifax as an employer. It's a credible source for others to learn about the kind of company we are, and what it's like to work here," she says.

What they learn is that Equifax has data at the core of its business competencies, providing consumer verification data and secure transactions for e-commerce. "If you're making a transaction through eBay, you're most likely using Equifax technology," explains April Lathan, vice president of global technology.

It doesn't hurt that Equifax is an IT business. "Information and technology are what we do for a living, around the world," Lathan says. Virgil Gardaya, chief technology officer, sits on the CEO's staff, helping develop and drive the company's strategy and business. Recently the company was awarded a project in Australia introducing financial card services that accommodates the requirements necessary for card service centers in both Australia and the United Kingdom. "That was a big coup for us," Lathan says. "It points to the fact that IT is the backbone of our business at Equifax."

While the business and projects attract employees, Crew believes the environment – what employees explain to others about the company – helps keep them. "We've worked hard to create an environment that allows technology employees to do work that is challenging, that provides learning opportunities and where they have the flexibility needed to get the job done. We're constantly watching to make sure we provide the challenge and the environment." Equifax employees are eligible for 401(k) matching programs on their first day of employment, and the company recently added 18 more funds to what's available for employee investment.

Just as important as listening to employees is responding. Lathan said in November the company opened an employee fitness center for use by Atlanta-based technology associates as a direct response to employee input. "We also focus on treating one another with respect and working together for our community." Lathan believes the environment and the work is exciting. "We're directly touching how e-commerce is developing around the globe," she says. "Everyone here



e y're Boosting Retention

interacts with team members in other countries, working as virtual teams. You learn about different cultures, what's going on technologically around the world."

Equifax is focused on measuring employee satisfaction. "We continue to work on improving technology employee retention through employee action teams, surveys and constant monitoring," says Crew. "Right now we're looking for people with skills in project management, database administration, UNIX system administration, quality assurance and testing, and programming. We look at the potential for each person, not just where they are today."

MEDIA Serv, Inc., MANHATTAN, NY

Ask anyone where company loyalty is strongest, and they'll tell you it rests in the hands of small companies that morph quickly to take on new challenges and accept new technologies and people. That's the situation at MediaServ, where a 60-member team serves clients including Bloomberg, The Guardian Life Insurance Company of America, William M. Mercer, Real Media and Viacom. "We are always in a hiring mode," says Karen Kugal, recruitment manager. "We hire potential and then allow people to create great results."

"Ultimately, what really keeps people here and attracts them to want to work here is that we work on really great projects," Kugal adds. "We seek those who have a love and a passion for technology, but who also have a full life."

The projects are varied. MediaServ has developed automated online broker portals, wireless automated stock trading processes at the NYSE, custom CRM applications, web-based financial systems for generating and analyzing investment portfolio scenarios, customized online auction systems, and customized digital dashboards. With a retention rate resting around 97 percent, MediaServ's approach is obviously working.

There are no large-scale processes to bring people on board. Instead, Kugal focuses on hiring people who can add value – people who bring something to MediaServ and who allow others to learn and to better serve consulting clients. "For instance, we had a new employee come in and offer up an entirely new way of extracting customer requirements that helped the entire team huddle and become involved with all aspects of the client's needs quickly. By encouraging everyone to bring their creativity and aptitude, we've been able to create a positive environment."

While there are typical compensation benefits – including semi-annual bonus awards – the company takes a personal approach to recognition, too. Each year MediaServ hosts a company "Holiday Weekend" at a ski lodge for employees, their significant others and children. Back at the office, home-cooked breakfasts are served monthly, "and you have the latest toys and tools to do your job," says Kugal.

The one thing "we can promise is that every day is different," she adds. "We ask you to use your passion to build extraordinary solutions for our customers, and we can guarantee you'll be working with some of the brightest people in the business."

THE MONY GROUP, NEW YORK, NY

The MONY Group competes in the dynamic financial services market among the aggressive financial services firms that are using technology to create new opportunities with customers for real-time service and response. As with other companies boasting of high retention and low turnover, MONY leaders point first to the environment as what attracts and keeps top talent.

"What we've found out is that we have created a unique environment here," explains Melanie Johnson, manager of IT human resources. "It's a challenging and rewarding environment, but it's also supportive." Johnson adds that being a company that is well thought of in a competitive market sector doesn't hurt. "We're growing and expanding our core financial services offerings," she says.

The support begins with a two-week boot camp that helps new IT employees understand the MONY strategy, customers and processes. A mentor is assigned

to the new IT employee, working with the individual to gain experience quickly and to maintain a careful watch to assure that the employee continues to grow and learn. The IT organization's place in MONY's growth and development has become more and more critical, whether in enabling it to become a publicly traded company or in developing e-business capabilities that help customers. "E-business is one of our biggest focus areas for the coming year, how it applies to financial professionals, customers and employees," adds Johnson.

While MONY has increased its direct contact with potential employees through the Internet and job fairs, its biggest employment blitz has been based on employee referrals. Fully 30 percent of all MONY IT employees hired in the past year have been a result of employee referrals. "People tend to refer people who are terrific," says Johnson. "Employees understand how we work and can quickly identify those who will add value to MONY."

To assure that MONY would meet the needs of employees – not just the majority – the company did a demographic study, looking at various age groupings, living situations and work situations. "We found that the employees in their 20s really want the technical challenge, and they have the hot skills needed to meet the challenge. We put them right into the hottest projects we have. There are other employees who have been here longer, who have the knowledge and leadership needed to keep things moving around obstacles."

Using this approach, MONY has a retention rate of 92 percent. The same study helped Johnson identify personal needs for employees – from dealing with aging parents to having no or little time for personal fitness. "We have given our (high performance work team) coaches the flexibility and free reign to do what is needed for employees, whether it's in terms of benefits, working tools or assignments."

MONY currently has about 350 people in its IT organization and is seeking newcomers primarily in application development. "We're trying to build an organization that is world class in system integration," reports Johnson. "It's critical that we attract people with business knowledge and analytical skills and who can help us identify, buy, customize and integrate applications. It's what will provide MONY with the speed it needs to continue to grow."

IT careers

For more job opportunities with IT firms, turn to the pages of **ITcareers**.

- If you'd like to take part in an upcoming **ITcareers** feature, contact Janis Crowley, 650.312.0607 or janis_crowley@itcareers.net.
- Produced by Carole R. Hedden
- Designed by Aldebaran Graphic Solutions

Senior Information Systems Support Technician I/II



Salary: \$4,521 - \$5,390/mo. + 7% PERS

The City of San Mateo's Department of Information Technology supports over 450 desktops and 150 laptops at 18 facilities networked together over leased lines and an Ethernet WAN. We are seeking a talented, self-motivated team player to fill the following position: Senior Information System Support Technician I/II.

The position helps maintain and support the City's local and wide area networks as well as provide second level PC support. Candidates must be able to perform a wide variety of complex technical duties involved in installation, repair and maintenance of personal computers, peripherals and network equipment under the direction of the Network Administrator.

Requirements include degree from two-year college/university in computer science or related field and one year of experience comparable to System Technician II position in City of San Mateo along with NT workstation experience.

For application, call the Job Hotline (650) 522-7777 x 424, or visit our website at www.ci.sanmateo.ca.us
Position open until filled. EOE

IT INITIATIVE LEADER

Battelle, a leader in the development and commercialization of technology, is seeking experienced IT professionals to lead efforts to create commercially-viable information technology and to support the launch of business ventures based on that technology. These positions are located in both **Columbus, OH and Richland, WA.**

In this role you will develop, lead, and actively participate in R&D initiatives. Ensure the development of Intellectual Property (IP) that has applications across multiple initiatives, products, and markets. Lead the development of commercially-viable IP and participate in the launch of IP-based commercial ventures.

If you have expertise in one or more of these areas: Information Analysis; Information Mining, Integration, & Visualization; Health, Medical, Bio, or Chem Informatics; eCommerce Applications; or Network or Information Security; a minimum of 10 years' program management experience; and experience creating, identifying, capturing, and protecting commercially-viable IP, we'd like to hear from you.

Are you seeking this kind of challenge and opportunity? Please submit your resume to Battelle at www.battelle.org/jobs, job reference no. 100984. Battelle is an Equal Opportunity/Affirmative Action Employer M/F/D/V.

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Software Engineer, Databases

Uses Object - Oriented Design and Analysis techniques in conjunction with C++ and Visual Basic to modify, test, debug, document, and develop non-routine complex computer programs. Based on large data set relational databases for the purposes of insuring data flow and data access within such relational databases. Insures the reliability and viability of such software systems and their integration in a TCP/IP environment which is run on multiple platforms. Uses class library software engineering techniques to modify relational databases for a systems implementation and integration into a financial trading system which will implement and interface within financial trading software in a real time environment to receive real time financial marketing pricing information. Tests, maintains, and organizes database structures to accommodate real and external information and insures network configuration including LAN, WAN, Windows NT, and internet connections by developing appropriate mathematical algorithms. Requires Master's degree in Computer Science. Education to include completion of one project in the solution of synchronization and concurrent software design process for client-server environments and one course in each of the following: Computer Communication Design, Concurrent Software Design, and Distributed Computing Principles. Hours 9:00 a.m. - 5:00 p.m. 40 hours per week at \$70,000 per year salary. Applicants must show proof of legal authority to work in the U.S. Please send resumes to: Mr. David J. Clark, Director of Employment Security, 401 S. State Street - 7 North, Chicago, IL 60605, Attention: Lydia Clarke, Reference #VIL243065-E. AN EMPLOYER PAID AD. NO CALLS.

MD Product Architect-(Champaign, IL) Determine the direction of the Mediation Device product. Resp. for on-time delivery of the product to the rest of the company & customers. Train MD support staff on the product. Work w/Development Mgr. To develop project plans for each new release or patch of product. Help gather req. from customers & internal staff. Create functional designs and assist with detailed design, coding, testing, documenting & implementation of product. Participate in development meetings & customer gatherings where necessary for gathering of req. and dist. of information. Work involves UNIX, C++, shell scripting, Object-Oriented Analysis & Design, Unified Modeling Language, File Transfer Access & Management, Graphical User Interface using Microsoft Foundation Class. Use object design methodologies & preparation of documentation. Req. a Master's Deg. or equiv. in Comp. Sci., Physics or any Math, Electronics or Eng discipline and 2 yrs. exp. in the job offered or 2 yrs. exp. as a Software Engineer. Must have exp. w/Object Oriented Analysis & Design, Unified Modeling Language, C++ programming on UNIX and shell scripting, Windows NT, C, SQL, advanced exp. w/networking & communication methods (TCP/IP & asynchronous communication programming), file transfer access & mgmt. protocols & call collection process, ability to write clear documentation and Clearance or RCS. 40 hrs/wk. M-F 9am-5pm. \$70,269/yr. Applicants must show proof of legal authority to work in the U.S. ILLINOIS DEPARTMENT OF EMPLOYMENT SECURITY, 401 South State Street-7 North, Chicago, IL 60605. At: Shella Lindsey, Ref. #VIL24252-L. AN EMPLOYER PAID AD. NO CALLS-SEND 2 COPIES OF BOTH RESUME AND COVER LETTER.

SENIOR TECHNICAL CONSULTANT-(Champaign, IL) Participate in all higher level complex specifications & development as it pertains to the analysis, design & development. Meet w/management to determine system req. and assist in refinement of req. leading to the development of technically feasible specifications. Participate in the development, testing (unit & system) & documentation of the req'd software. Participate in development of work plan to conduct planning assignments; meet w/senior client mgmt. To develop business model; meet w/senior personnel to define info req. of detailed activities contained in the business model; determine commonality of info req. by defined application systems and develop data architecture showing how & where data will be maintained & shared; inc. Organization of the utilization of the database as well as determining how & call collection will access the database. Assist EDP development staff and users to ensure that the applications are in conformity with the optimal use of the existing system's architecture. Req'd: Bach. Deg. in Comp. Sci., physics or any Math, Electronics or Eng discipline and 3 yrs. exp. in the job offered or 3 yrs. exp. as an Analyst/Software Developer. Must have exp. in UNIX, SQL, C, C++ & GUI Programming, & billing, supervisory & telecommunications industry. 40 hrs/wk. M-F 9am-5pm. \$66,706/yr. Applicants must show proof of legal authority to work in the U.S. ILLINOIS DEPARTMENT OF EMPLOYMENT SECURITY, 401 South State Street-7 North, Chicago, IL 60605. At: Shella Lindsey, Ref. #VIL24049-L. AN EMPLOYER PAID AD. NO CALLS-SEND 2 COPIES OF BOTH RESUME AND COVER LETTER.

Manager-Web Development-ABC-Naco, Inc., Owners Grove, IL - Direct implementation of enterprise resource planning software; develop, implement & support new Information Technology solutions; assist in migrating existing software and hardware systems; and implement and maintain E-R-P software package. Administration of Microsoft NT4, 1154, SQL 7 and Backup tools. Apply marketing concepts and strategies to web-based communications tools. Requires a B.S. in Business Administration/Computer Science/Information Technology or equivalent required. Fax resume to Jon Vignio at 630-737-0167. No calls please.

PROGRAMMER/ANALYST/POWERBUILDER DEVELOPERS Resp. for developing, testing, implementing & supporting business software applications. Employing a warehousing program utilizing Power Builder 5.5, Sybase 11.9 & Windows 95 to develop specialized database systems. Develops future changes & upgrades following full systems testing. Requires Bachelor's degree or foreign equivalent with 3 years exp. in software development or Master's degree in Computer Science. Must also be proficient in Power Builder 5.5, Sybase 11.9 & Windows 95. Send resume w/cv to Bill Bennett, Office: Technical Services, 77 Monroe Center, NW, Suite 605, Grand Rapids, MI 49503.

Senior Systems Analyst for West Central Illinois company. Requires B.S. in either Computer Science or Electronics Engineering. +2 years experience as a Systems Engineer. \$70K per year, 8:00 a.m. - 5:00 p.m., 40 hrs/wk. Consult with client companies to determine user requirements. Develop analysis models and logical data models using object-modeling tools such as, Rational Rose. Evaluate user requests for new & modified programs, determine feasibility, time & cost. Formulate plans outlining steps required for program development using object oriented analysis and design techniques using UML methodology and design patterns. Manage the development of applications using object-oriented languages such as Java and C++ and relational databases, Oracle & DB2. Applicants must show proof of legal authority to work in the U.S. Send resumes to: ILLINOIS DEPT. OF EMPLOYMENT SECURITY, 401 S. State Street - 7 North, Chicago, IL 60605, ATTN: Leonard Boka, Reference #VIL 24309-B. AN EMPLOYER PAID AD. NO CALLS-SEND 2 COPIES OF BOTH RESUME AND COVER LETTER.

Investment Analyst Software Industry Equities

Capital Research Company, Los Angeles, is seeking an Investment Analyst with at least a Bachelor's degree (finance, economics, or business) and 5 years of prior experience as an investment researcher or management consultant. Area of coverage: software industry equity analysis. Involves monitoring of global software industry technologies; corporate asset valuations; on-site fact-finding; development of industry models and forecasts; buy-sell recommendations. Resumes to Management Recruiting, 351 S. Hope St., Los Angeles, CA 90071 or www.capgroup.com/employment. We are an equal opportunity employer.

COMPUTERS

Software Sales Consultant. Assume lead role in the preparation and presentation of technical sales demonstration, seminars and meetings to sell IBM software development tools in client/server computing environments. Provide a source of state-of-the-art expertise in systems architecture and explain technical specifications and capabilities of software products. Participate in analysis and design of system prototypes. Must have BS in Computer Science, Info Systems, Ops Research, Comp. Eng. or academic equivalent +2 years' software consulting, development or training experience. Location: Boston area. \$65,000/yr. 8 am to 5 pm. Send 2 copies of resume to Case # 19992953, Labor Exchange Office, 19 Stanford St., 1st fl., Boston, MA 02114.

Software Engineers (multiple positions) sought by Dallas, Texas-based Comp S/ware Consultancy Firm. Must have Bach or equiv in Comp Sci or Engg & 1 yr s/ware exp. Respond to: HR Dept., Innovative Business Solutions, Inc., 5353 Alpha Road, Suite 108, Dallas, TX 75240.

SENIOR TECHNICAL CONSULTANT-(Champaign, IL) Responsible for independently planning, developing, testing & documenting non-routine complex computer programs incl. Ingres ABF4GL using C on a UNIX platform & TRIS +2 modules. Analyze, design, develop, implement & maintain non-routine, complex programs incl. TRIS+2 modules & Ingres ABF4GL. Analyze customer requirements & product function capabilities. Responsible for making recommendations based on function & cost benefit analyses & maintaining products which involve debugging & performance improvement. Req'd: Bach Deg. in Comp. Sci., Physics or any Math, Electronics or Eng discipline and 3 yrs. exp. in the job offered or 3 yrs. exp. as a Programmer/Analyst. Must have exp. in UNIX, SQL, C, SQL, C++ & GUI programming & billing, supervisory & telecommunications industry exp. 40 hrs/wk. M-F 9am-5pm. \$60,900/yr. Applicants must show proof of legal authority to work in the U.S. ILLINOIS DEPARTMENT OF EMPLOYMENT SECURITY, 401 South State Street-7 North, Chicago, IL 60605, At: Shella Lindsey, Ref. #VIL24002-L. AN EMPLOYER PAID AD. NO CALLS-SEND 2 COPIES OF BOTH RESUME AND COVER LETTER.

Software Consulting/Variou places in U.S. SW Engr. Prog/Analyst, DB Devel & Admin, Tech Supp, Syst & Ntwrk Admin, MIS, Tech Recr, etc. Req MS/BS + exp. Exlt pay & benes. Send copy of this ad + your resume to Dir. Recrmt, CompuWizards, 1301 Ygnacio Valley Rd., Walnut Creek, CA 94598 or visit us at www.compuwizardsusa.com

Two full time Consultants needed for a large mobile communications network company. Must have a Bachelor's degree in Electronics and Communication Engineering or Electrical Engineering or foreign degree equivalent accepted and two years of experience. Salary: \$69,160/yr. Send resume to: Chip Anderson at Logica Radio Planning, Inc. 3535 Travis Street, Suite 100, Dallas, Texas 75204.

Various Jobs (Consultants): Various places in U.S. SW Engr., Prog/Analyst, DBA, User Supp, Supv etc. Pay DOE. Send copy of this ad + your resume w/salary reqs, job interests to: Geosoft Infotek, CA 94015 or email: geolog@mindspring.com.

PROGRAMMER/ANALYST Design code, test, debug, implement, maintain & document programs using various programming languages & operating systems, perform routine system analysis, logic programming & test data creation, perform technical analysis & make recommendations concerning utilization of system and business resources. B.S. in Electrical Engineering (or closely related field) & 1 yr. exp. as Programmer/Analyst or Computer Eng. 8:00 a.m. - 5:00 p.m. \$50,000.00/yr. Fax resume to (248) 559-8306 - Attn: HR Mgr.

SENIOR TECHNICAL CONSULTANT-(Champaign, IL) Responsible for independently planning, developing, testing & documenting non-routine complex computer programs incl. Ingres ABF4GL using C on a UNIX platform and TRIS+2 modules. Analyze, design, develop, implement & maintain non-routine, complex programs incl. TRIS+2 modules & Ingres ABF4GL. Analyze customer req and product function capabilities. Responsible for making recommendations based on function & cost benefit analyses & maintaining products which involve debugging & performance improvement. Req'd: Bach. Deg. in Comp. Sci., Physics or any Math, Electronics or Eng discipline and 3 yrs. exp. in the job offered or 3 yrs. exp. as an Analyst/Software Developer. Must have exp. in UNIX, C, SQL & Ingres/4GL, billing & Customer Care business applications. 40 hrs/wk. M-F 9am-5pm. \$69,102/yr. Applicants must show proof of legal authority to work in the U.S. ILLINOIS DEPARTMENT OF EMPLOYMENT SECURITY, 401 South State Street-7 North, Chicago, IL 60605, At: Shella Lindsey, Ref. #VIL24048-L. AN EMPLOYER PAID AD. NO CALLS-SEND 2 COPIES OF BOTH RESUME AND COVER LETTER.

Senior Consultant/Analyst-provides software consulting services in an IBM mainframe environment to diverse clients; participates in full-life cycle development, including development, implementation and testing of system-wide applications; analyzes user needs; uses packaged software to perform basic database manipulation with a relational database management system (RDBMS); must have documented ability to program in COBOL II, Java 1.2 and PL/SQL 8.0, or B.S. degree in computer science, engineering or math and 2 years experience. Hours: Mon. - Fri., 8:00 A.M. - 5:00 P.M., St. Louis MO. Salary: \$59,600/year, per experience. 5 available positions. Send resume to: J. Gaston, Div of Workforce Dev., 4440 Seven Hills Dr., STE 166, Florissant MO 63033. Refer to job order #245678/247736.

Unix Network Administrator-HCIASachs, Evanston, IL - Upgrade, configure and set up Sun 6500. Assist with relocation of entire data warehouse. Administer multiple UNIX environments. Set up security, file systems, hardware and software configuration. Perform system upgrades to multiple UNIX platforms. Serve as UNIX point person for information systems team. Utilize UNIX and Windows NT for user accounts and troubleshooting. Requires a B.S. in Computer Science. Fax resume to K. Kelly at 847-475-0211. No calls please.

Sr. Programmer/Analyst (Chicago, IL & other U.S. client sites). Analyze, design, code, test, upgrade, & implement client application systems; migrate systems to PC architecture; produce application documentation; design/execute test plans; provide technical support. Environment: IBM Mainframe, COBOL, JCL/CICS; Visual Basic MS Project; MS Access. Master's degree in Comp. Sci. or Math or Engg +1 yr exp or a BS degree in listed majors + 5 yrs exp. 40 hrs/wk. 8:30am-5pm. \$75K/yr. Must show proof of legal authority to work in U.S. Send 2 copies of resume & cover letter to: Illinois Dept. of Employment Security, 401 South State St., 7 North, Chicago, IL 60605. Attn: Arlene Throver; Ref #VIL 23201-E. Employer Paid Ad No Calls.

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Senior Software Consultants needed at various sites! Manage a variety of projects: design, develop, analyze, implement, test, debug, document, maintain, upgrade & support business applications for retail/distribution/manufacturing industries. Conduct sales and business studies; draft proposals and systems solutions; train end users & manage new development handover. Bach Degree (or equiv in educ/exp) in Comp. Sci./Computer Information Systems/related & exp. in retail/distrib/manuf applications consulting required. Fax resume to HR@ (941)596-5815.

Programmer Analyst needed to test, design, maintain and update software applications for SCADA systems and assist in computer system operations. Requires B.S. in CS or EE plus 3 years experience or M.S. in CS or EE plus 1 year of experience. Also requires knowledge of C, C++, or UNIX. Competitive Salary. Send resume to ACS, Human Resources, 2755 Northwoods Pkwy., Norcross, GA 30071. Refer to Job RC01CW.

Teradyne, Inc., a leading manufacturer of Automatic Test Equipment, seeks a Senior Applications Engineer for its Bedford, MA office. Will work as part of the Advanced Development Team developing a next generation test division. Requires degree and industry experience. If interested and qualified please send resume to Human Resources, Teradyne, Inc., 9 Crosby Drive, Bedford, MA 01730.

SYSTEMS ANALYST Investment Management firm seeks Systems Analyst to provide software support and database management for computer-driven trading & accounting systems in a networked Sun/Solaris Unix environment. Duties include software development, maintenance and testing for equities databases, and various reporting programs. Successful applicants must possess Master's degree in Computer Science or Engineering. Salary commensurate with experience. Mail resume to RTC, 600 Route 25A, East Setauket, NY 11733, attn: RM

Sr. Programmer Analysts needed by NJ IT Co. to analyze client communications, informational & prgmng reqmts; & plan, dvlp & dsgrn business prgms & comp systms. Apply to Global Consultants, 601 Jefferson Rd, Parsippany, NJ 07054.

Software Engineer: Develop embedded device drivers for a multitasking OS to support dual processor communications & parallel processing. Req. MS in CS or EE with proficiency in C/C++, assembly language, GNU tools & Visual SourceSafe plus one year experience in job offered \$64k-74k/yr., 8-5, contact Robin Larkey, HR, Scientific Atlanta, Inc., 5030 Sugarloaf pkwy, Lawrenceville, GA 30042, fax: 770-236-6165.

Computer Graphic Designer wanted by New York-based High End Visual-Effects & Design Firm. Must have Bach degree in Comp Art, Graphic or Product Design & 1 yr in job offered. Respond with resume & cover letter. Fax to: (212) 986-2113, Attn: Production Dept.

Computer Engineer. Will be involved in Digital & Analog dsgrn, embedded real-time microcomputer medical system dsgrn using 960Rz, MOT, MIPS uPs, ESD, EMC, EMI, RF testing (design for 510K), ECG, SpO2, Co2 waveform filter dsgrn & Arrhythmia Detection s/w development. Will use RTOS, assembly Lang., OO dsgrn in C/C++, VB, emulators, Labview, test equipment P.D.A./PDA, CDE, Synopsys, PCB Layout, ISA/PCI bus. Requires a BSCE or BSEE with 2+ years experience in the above areas. Apply to General Medical Inc., 523 Lakeview Rd, Clearwater, FL 33756

Full time Project Manager responsible for the development of new software and enhancements. Command of Crystal Reports and software packages including Word, Excel, PowerPoint, Front Page, Visio, and various graphic packages. Provide software support to clients. Utilizing networking and website design and maintenance. Attend trade shows and exhibitions to promote software and services. Must have ten years of experience in the position or position with same duties. Salary \$64,655/yr. Send resume to: Bryan Amaral at ImageWare Technologies, Inc., 3340 Peachtree Road NE Suite 1800 Atlanta, GA 30326.

INFORMATION ARCHITECTS seeks IT professionals with Bachelor's and/or Master's degrees in Comp. Sci. or related fields for Web design and development projects using JAVA, C++, Object Oriented Design and SQL. Send resumes to: Information Architects, H.R. Dept., 4064 Colony Rd., Charlotte, NC 28211.

Software Co. in NJ seeks to fill Software Engng Positions - Must have Masters & 2 yrs exp or Bach & 2-5 yrs exp in dsgrng, dvng & testing s/ware applics using VB, C, C++, Java, ASP, CGI, SQL, Oracle or SQL Server. Respond by resume to HR Dept., Innospire Systems Corp, 267 Amboy Ave, Ste 114, Metuchen, NJ 08840.

Software Engineers (multiple positions) sought by New Jersey based Comp S/ware Consultancy Firm. Must have Bach or equiv in Comp Sci or Engng & 1 yr s/ware exp. Respond to: HR Dept., Internet Global System, 475 Wall Street, Princeton, NJ 08540.

Software Dev. Comp. req. Software Engng. with M/S & 1yr exp. or its equiv & Prog. Analyst w/BS & 2 yrs exp. in fol: Oracle, Forms & Reports, VB, Erwin, Designer 2000, Crystal Reports, Unix (Dec-Alpha, HP-UX), NT, HTML/DHTML, Java, C, C++, Datawarehouse. Excel Benefits. Apply w/resume to Trinet Solutions, Inc., Attn: Recruiter, 7 Joanne Court, Bridgewater, NJ 08807.

Advisory Programmer, Product Development wanted by a Telecommunications co. in Newark, New Jersey. Must have a MS in Computer Science, M.I.S. or related field & 4 years exp as Programmer Analyst/Software Developer/Consultant with 2 yrs. exp. in C++ & Delphi. Respond to Net2Phone, Inc., 520 Broad Street, Newark, New Jersey 07102 reference RIRSB1000.

Full time Senior Project Engineer to design and create GUI (Graphic User Interface) with Visual C++/MFC (Microsoft Foundation Classes). Object-Oriented C++ programming in Windows NT. Must have a Master's Degree in Computer Science, or related field. Educational or work background must have included object oriented programming and Visual C++ 5.0/MFC. Salary: 59,775/yr. Send resume to: Electronic Tele-Communications, Inc., 1854 Shackelford Court, Suite 400, Norcross, GA 30093, Attn: Elaine McTye.

EventZero, Inc., providing end-to-end technology solutions for businesses has the following positions available in the Boston, MA and New York, NY areas: Senior Business Strategist, Technical Lead, Computer Systems Analyst, and Project Lead. Requirements vary depending on position. If interested and qualified, forward resume to: Human Resources, Event Zero, Inc., 5 Water Street, Arlington, MA 02476.

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New ICANN Domains Could Spark Legal Action

Trademarks, cybersquatting are key issues for firms looking to register Web addresses

BY PATRICK THIBODEAU
MARINA DEL REY, CALIF.

THERE WAS A LOT at stake for businesses and special-interest groups — issues that ranged from trademarks to the bottom line — in the process that was used to create top-level domains at last week's meeting of the Internet Corporation for Assigned Names and Numbers (ICANN) here.

The business benefit of the new top-level domains, especially the major .com competitor, .biz, remains to be seen. In any case, to protect their trademarks, businesses may have to act quickly and defensively to register all of their trademarks in the new domains to protect them from cybersquatters and

subsequent legal action, observers said. Moreover, while the new domains create opportunities for inventive names, it's possible that legal challenges could be mounted against businesses that register a generic name — an xyz.biz,

Trademark Protections

Sunrise: Under a plan being considered by some registries, trademark holders may get first crack at registering when new domains are offered.

No sunrise: Small businesses in particular say trademark preference will hurt them.

for example, that is already being used in the .com domain.

Operating a registry is potentially profitable if large numbers of people and businesses register a certain domain. Among the countries that saw that potential is Dubai, which sought to get the registry business for a .go domain as part of its national e-business strategy.

"Dubai is a natural hub between the East and West, and you need connectivity in the Middle East," said Lars Olof Kannard at Dubai Internet City, a Dubai government-sponsored organization. But the effort was unsuccessful, as the ICANN board disapproved Dubai's go application.

The Washington-based National Cooperative Business Association did win approval to run a registry for the .coop domain, which would be restricted to the approximately 750,000 business cooperatives worldwide. The association

said consumers who specifically seek to do business with cooperatives would be able to locate them more easily if their Web sites could use .coop, said Paul Hazen, the association's president and CEO.

"Co-ops traditionally have not fit easily into .com," Hazen said. "We're not true investor-owned businesses." But neither do they fit into the .org top-level domain, he added.

Domain Disputes

One particularly contentious issue concerns the protection of corporate trademarks from cybersquatters after top-level domains are created. Intellectual property groups tried to persuade the ICANN board to ensure that any new top-level domains include "sunrise" provisions, giving trademark holders the right to register protected names before anyone else can usurp them.

Michael Heltzer, government

relations manager at the International Trademark Association in New York, said the sunrise provision being considered by ICANN would have its limits, however. For example, companies wouldn't be able to register creative misspellings or derogatory alterations — such as "xyzsucks" — to block others from using them. "It's not as much as we would like, but it's a start," Heltzer said.

Those limitations notwithstanding, the plan still has its opponents. David Corish, the owner of Functional Metal, a maker of custom lighting and ironworks in Los Angeles, argued that giving trademark holders first rights to pick out the domain names they want is unfair to small businesses like his. "It gives some companies access to domain names on a silver platter," said Corish, whose position is supported by the U.S. Small Business Administration.

The trademark protections will be part of ongoing negotiations between ICANN and the registries before the domain agreements are signed. Although they want to sign the agreements by the end of the year, ICANN officials said the new domains may not be available until the second quarter. ■

Continued from page 1

Domain Names

specific domains such as .coop, which is meant for cooperatives, will win widespread acceptance. ICANN had received more than 200 proposals for new domains from some 44 applicants, and there was anger over the selection process that eliminated most of them.

"The right to due process should outweigh expediency," said Lou Kerner, a partner at the dotNom Consortium in Pasadena, Calif. The remark was greeted with sustained applause from many of the attendees in a packed hotel ballroom here. Kerner is also CEO of dotTV Corp., a Pasadena-based company that issues Web addresses using the .tv extension.

Kerner, along with the other applicants, was given three minutes to defend his top-level domain application before the board. He spent his allotted time attacking ICANN's process and warning of potential lawsuits from the losers.

Dyson was unsympathetic to Kerner's arguments. "We gave you a chance to speak, and you did not take very good advantage of it," she said. Kerner's plan didn't make the final cut.

Consortium Controversy

Particularly controversial was a proposal by Afiliis LLC, an organization that includes 19 registrars, including Herndon, Va.-based Network Solutions Inc., the domain registration unit of VeriSign Inc., to run the registry for a .web domain.

Dyson said the formation of the Afiliis consortium could

potentially impede competition among domain names. "The whole thing gives me a queasy feeling, is the short way to say it," she said.

In the end, Afiliis failed to get the .web domain it wanted. Board member Vinton Cerf, citing the fact that Image Online Design Inc. in San Luis Obispo, Calif., maintains an unofficial .web registry, successfully argued to give Afiliis its second choice, .info. Image Online's application to officially operate a .web registry wasn't approved in this round either.

Paul Garrin, CEO of NameSpace Inc., a New York-based company that sought approval for a slew of domains, including .shop and .sucks, said Afiliis "should not have been awarded anything in this process [because] they already have market dominance." ■

Kodak to Offer Film-Based Data Storage Services

Could prove a boon to IT data integrity

BY MARK HALL
LAS VEGAS

Eastman Kodak Co. CEO Dan Carp last week unveiled several future products and services, including one that may interest information technology managers struggling to manage documents in formats no longer readable by commercially available systems.

At his Comdex/Fall 2000 keynote speech, Carp said the Kodak Digital Preservation Solution will allow users to save

documents and images by clicking on a desktop icon, which will send the file to Kodak, where it will be stored "in human-readable form" — that is, film. The document will be encoded with hidden digital information so it can be retrieved by systems as well as people.

"Every IT manager responsible for data integrity has been thinking about this for years," Carp said.

George Feitel, an analyst at technology researcher Wavara in Chicago, said, "Making preservation convenient to use is a big plus. Kodak is taking an end-to-end approach to documents and images." ■

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FRANK HAYES/FRANKLY SPEAKING

Butterflies aren't free

FOR MORE THAN A WEEK, this presidential election should have been history. Instead, candidates and political operatives and judges have battled over problems created by a lousy user interface. It's easy, in hindsight, to see what's wrong with that now infamous "butterfly" ballot from Florida. In order to make the type larger and easier to read — a laudable goal — the ballot designer juggled the layout, which made it less obvious which hole should be punched for each voter's candidate of choice.

Result: The butterflies apparently confused 19,000 voters enough that their ballots were thrown out.

Were those voters stupid? Were they addled? Did they just not get it? That's not the point. They were voters. No matter how much better it was supposed to be, the mechanics of the butterfly ballot shouldn't have gotten in the way of their ability to vote.

Your Web store has butterflies of its own. You just don't call them butterflies. You call them animations, or image maps, or Boolean search engines, or site-navigation tools. They're supposed to make the Web buying experience more entertaining, more fun, a better "user experience."

But way too often, the mechanics of those Web butterflies just get in the way of customers' ability to buy.

We're not trying to make it hard for customers to give us their money. But somehow, we do. Navigating many Web stores is still miserable. Finding basic information on products — prices, sizes, what they're made of, what they work with — is often impossible.

And finding the products themselves can be a nightmare when the only choices for site navigation are retrofitted search engines and random clicking. Am I supposed to click on that dancing product montage, or is it just a show? In which of those categories at the side of the screen is my product? If the search engine doesn't turn it up, does that mean this Web store doesn't have it?

Sure, those butterflies can make a Web store more visually appealing, more entertaining, better structured. And that's a good thing — but not if it makes the site hard to use or drives customers away.

If butterflies are getting in their way, those dancing animations and complicated site

designs could cost you dearly.

How do you know if they're helping or hurting? There's no design principle, no logical syllogism, no simple rule that guarantees a site will be easy to use. There's only one way to know: You've got to test it. On real users. And keep testing it, monitoring how many of your potential customers walk away in apparent confusion and identifying what's pushing them out the door.

OK, there is *one* principle: You want your customers' money. Anything that helps them give it to you is good. Whatever gets in the way is bad.

Convinced? That's just the first step. Next is convincing the people outside IT who are involved in your Web store. The consultants, the marketing people, the graphics designers — all the people who are most likely to add butterflies to your Web store.

You've got to get them on-board with the idea of user testing — early and ongoing. And you've got to get them focused on a single idea: Nothing is more important than helping customers give you their money.

Not beauty. Not legibility. Not entertainment value. Not logic. Not whiz-bang flashiness.

Just the ability to do business. Everything else is secondary.

Because if customers can't figure out how to buy what they want from your site, they'll dump you and get it from your competitor.

And you won't get a recount. ▀

Hayes, Computerworld's senior news columnist, has covered IT for more than 20 years. Contact him at frank_hayes@computerworld.com.

Anything that helps your customers buy your stuff is good.



SHARK TANK

WAY BIG STEEL Michigan steel distributor is used to hefty orders from Big Three automakers, but an EDI-coordinator pilot fish is stunned by one purchase order last Wednesday — for \$97 million. She checks with the auto plant's harried purchasing rep and gets the story. Seems consultants installed the new EDI system a week before and took off, leaving no tech support on-site. Once up and running, the new system fires off EDI purchase orders to vendors for every item they sell. "This was all a big error — please ignore the P.O.," says the rep. And that \$97 million order? Not such a big mistake, the rep says — some of the berserk system's P.O.s were for more than a billion dollars.

RODENT TALE I In the midst of a plague scare in India, IT pilot fish orders 100 computer mice from local reseller. Weeks go by — but no mice. Fish finally confronts the sales rep in person, who agrees to cancel the order. But it's not his fault, he insists: "Our shipment is coming from Singapore, but due to the plague scare, the government imposed a ban on anything that has 'mouse' written on it."

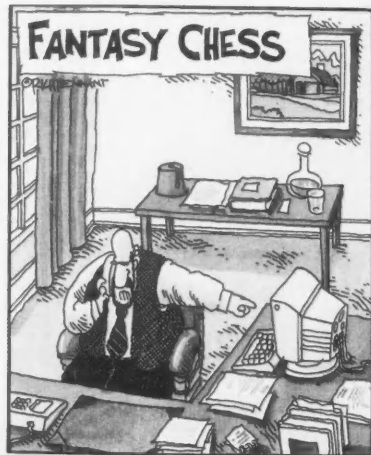
RODENT TALE II Service tech

pilot fish's work order for kindergarten classroom 1A says "Can't get e-mail." Sure enough, that PC won't log on to the network. He checks the cable connection, the hub, even recopies software onto the PC — no luck. He checks the cable again and this time finds a spot where it's almost gnawed through. He also spots a rabbit in a cage. "Oh yes," says the teacher, "we let him run around the classroom every afternoon." Fish replaces the cable. Three days later, another work order comes in for 1A: "Rabbit ate the e-mail again."

ENGINEER STORMS into IT pilot fish's office, snarling, "Thanks for getting me in trouble with that new laptop." What's wrong? asks the fish. Did he misconfigure something? "You left Solitaire on my computer! I was playing a hand, and my boss came in and caught me," howls the user. "Come over right now and get rid of those games — just in case I can't resist the urge to play them again!"

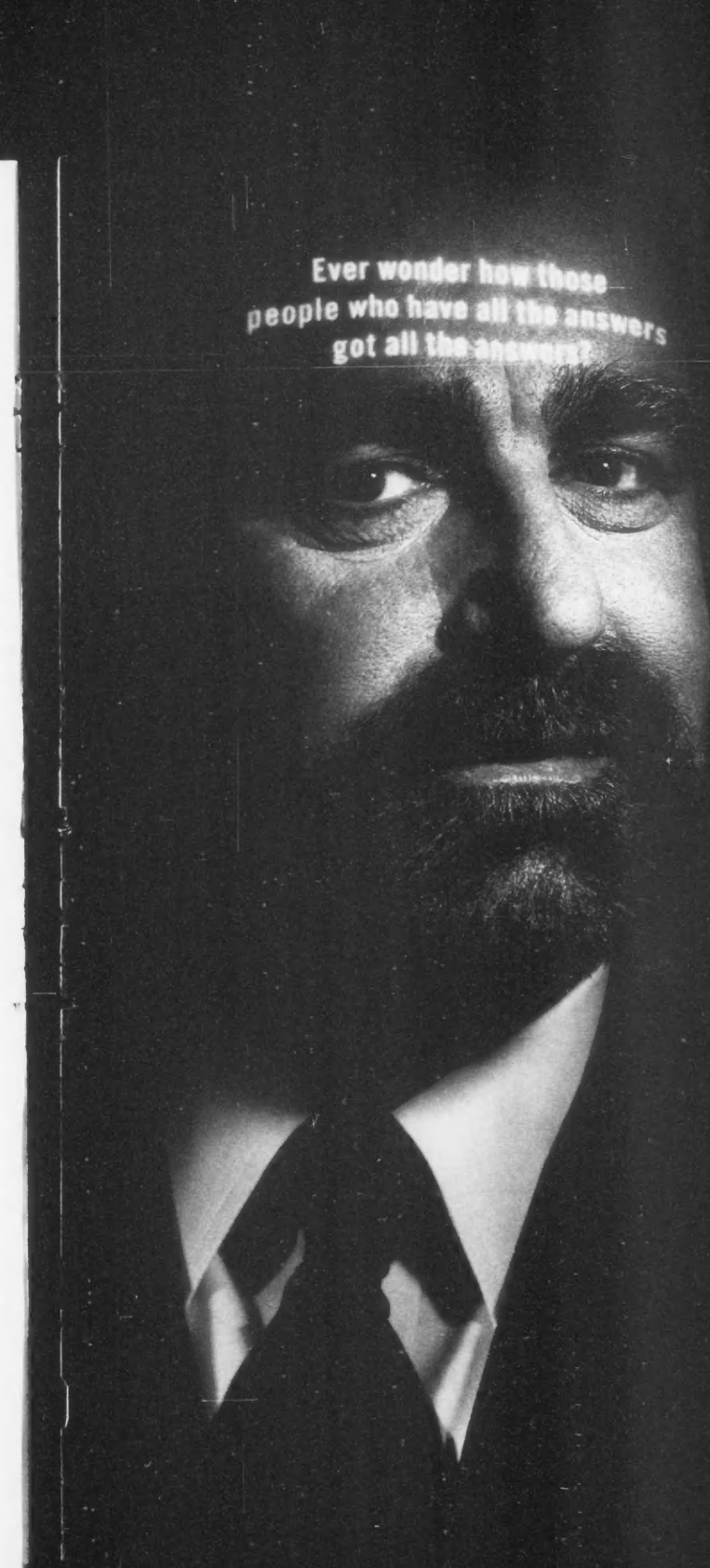
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The 5th Wave



"See here, Tepperman. Playing chess online doesn't mean you can draft IBM's Big Blue supercomputer as a mid season replacement."

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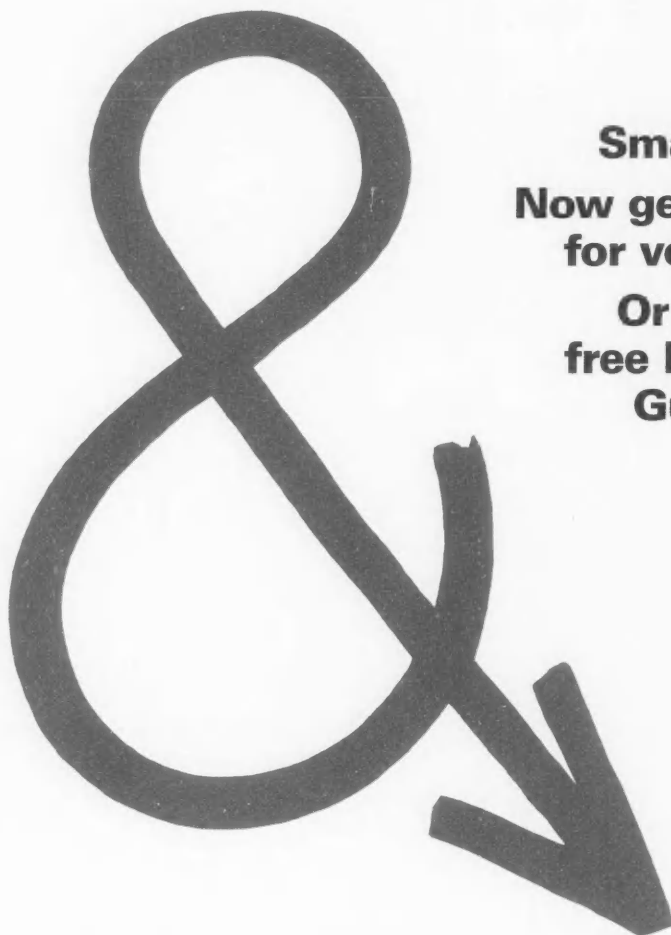
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got all the answers?

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